

NAPA COUNTY


GENERAL PLAN

INSTITUTE OF GOVERNMENTAL
STUDIES LIBRARY

OCT 11 1990

UNIVERSITY OF CALIFORNIA





Digitized by the Internet Archive
in 2024 with funding from
State of California and California State Library

<https://archive.org/details/C124904997>

NAPA COUNTY GENERAL PLAN

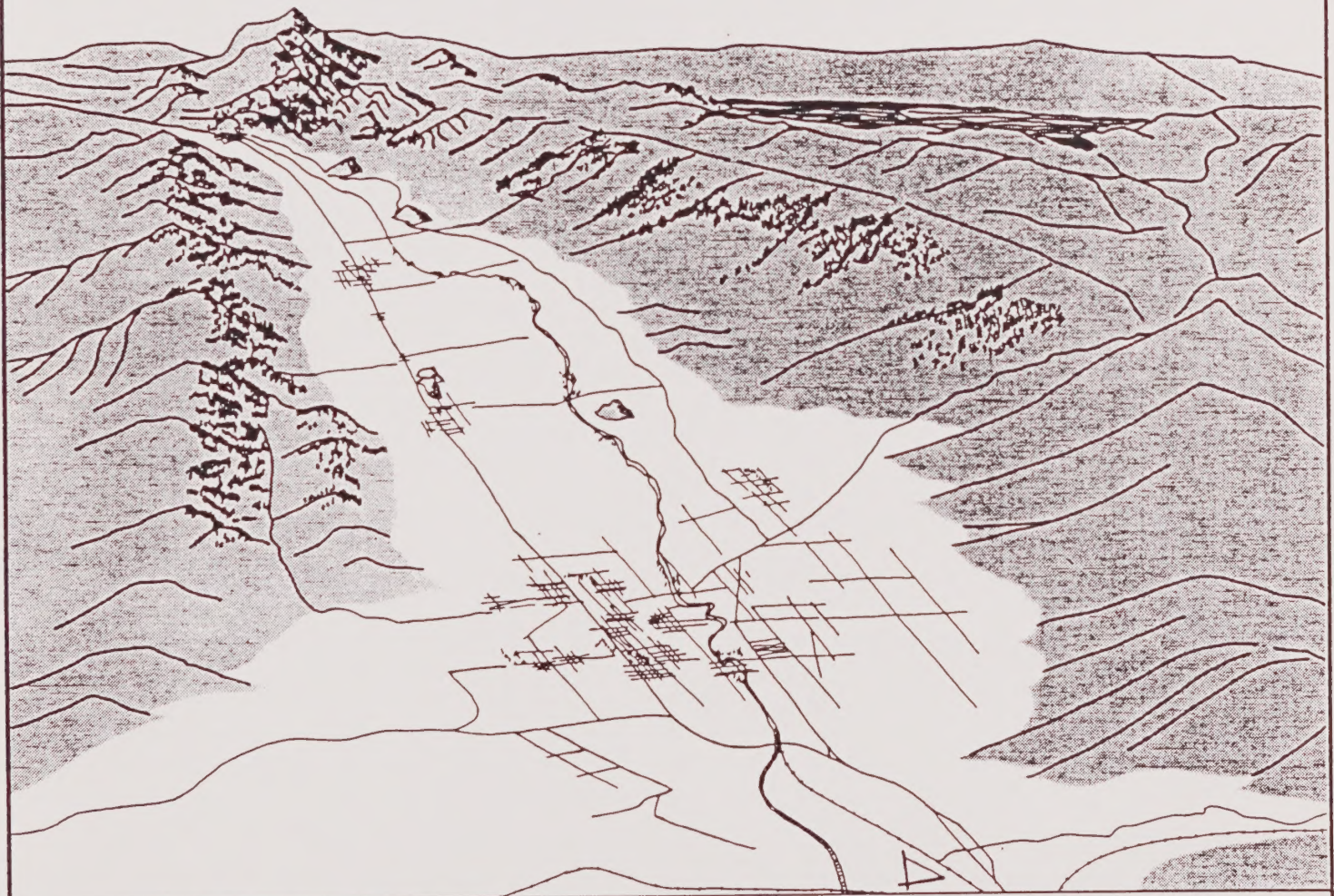
Adopted by the Napa County Board of Supervisors on June 7, 1983

As Amended through June 26, 1990

NAPA COUNTY
1986 GENERAL PLAN
TABLE OF CONTENTS

	<u>PAGE</u>
I. INTRODUCTION	i
II. LAND USE ELEMENT	1
III. HOUSING ELEMENT	40
IV. GROWTH MANAGEMENT SYSTEM	136
V. SCHOOL FACILITIES	152
VI. CIRCULATION ELEMENT	159
VII. SCENIC HIGHWAYS ELEMENT	207
VIII. CONSERVATION ELEMENT AND OPEN SPACE ELEMENT ...	213
IX. SEISMIC SAFETY	251
X. SAFETY ELEMENT	311
XI. NOISE ELEMENT	381
XII. INDEX	424

INTRODUCTION



GENERAL PLAN

QUALITIES OF THE NAPA COUNTY GENERAL PLAN

The Napa County General Plan has been prepared in a form designed to meet a number of legal and policy objectives including the following:

1. Fulfill all current legal requirements.
2. Provide a concise summary of County planning goals.
3. Indentify the component parts of a balanced program for the County's future.

In fact, it meets all three.

1. The County General Plan fulfills the Legal Requirements of the State of California for a:

"...comprehensive, long term general plan for the physical development of the County ...

"...(with a) diagram and text setting forth objectives, principles, standards and plan proposals ...

"...(constituting an) integrated, internally consistent and compatible statement of policies ...

"...that reflect local conditions and circumstances ..."

2. The Napa County General Plan summarizes County Planning Goals and objectives; and establishes a balance between diverse, and in some cases, conflicting programs. It helps maintain the compatibility of economic and environmental objectives and provides guidance for the allocation of resources and the preservation of important County values. A summary of the general goals contained in the Plan can be described as a statement of Intent to:

PRESERVE AGRICULTURE, AND
CONCENTRATE URBAN USES IN EXISTING URBAN AREAS.

In a more detailed sense, the essence of the Napa County General Plan is to:

"...ensure the long term protection and integrity of those areas identified in the General Plan as agricultural, open space or undevelopable...(as well as to) stimulate the development of those areas identified in the General Plan for residential, commercial and industrial (uses)."

That philosophy is translated into a framework for the future that has been tested and found to be generally acceptable to the citizens of Napa County. The Napa County General Plan is, in a sense, a "constitution" for the County's future, through which many different points of view have been reconciled. The plan considers the future physical development of the County and its environs in relation to identified social and economic objectives.

3. The Napa County General Plan is a Program For The Protection and Development of the unincorporated area of Napa County, composed of numerous interconnected goals and policies. While the Plan is a flexible guide, it is nonetheless legally binding; development proposals such as land subdivisions and use permits must, by State law, be considered in the light of its contents. The Plan is a guide which enables citizens to anticipate the County's reaction to individual development programs or projects.

ORGANIZATION OF THE NAPA COUNTY GENERAL PLAN

The Napa County General Plan includes the following nine elements, as required by law:

1. Land Use
2. Housing
3. Circulation
4. Scenic Highways
5. Conservation
6. Open Space
7. Seismic Safety
8. Safety
9. Noise

The Plan also includes the following two elements, as permitted by law:

10. Growth Management System
11. School Facilities

The Plan is organized as follows:

1. At the beginning of the Plan, and at the beginning of each element, a generalized summary of the material which follows is provided.
2. Likewise, the first element of the Plan (Land Use) summarizes the other ten elements of the Plan by describing the general distribution, location, and extent of the uses of land for housing, business, industry, agriculture, open space, etc.
3. The elements following Land Use contain more detailed information and references. In the text of each element, there are also references to the base data which was used to compile that element.
4. The index of the end of the Plan provides a useable reference aid to specific parts of the Plan.

The General Plan was prepared in the manner as described so that the reader can read as little, or as much, as his or her need for detail requires; and use the Plan as a guide to available reference material on geographic, demographic and environmental matters.

EVOLUTION OF THE GENERAL PLAN

General Plans change over time; those goals and objectives which continue to enjoy public acceptance and support remain a part of the Plan; those aspects which no longer have public support or are not relevant are eliminated. Napa County's General Plan has evolved to its present form as follows:

- 1954-1955 Adoption of the first County General Plan which covered the unincorporated area as well as all the then existing cities, and resulted in the adoption of the County's first zoning ordinance in 1955.
- 1968 Creation of the Napa Valley Agricultural Preserve, which established the importance in Napa County of preserving prime agricultural areas.
- 1973-1975 Adoption of Conservation, Open Space, Seismic Safety and Land Use Elements of the Napa County General Plan, which identified the importance of preservation of agricultural lands, urban development in urban areas, and limited development in hazardous areas.
- 1977-1980 General Plan Consistency Rezoning to translate the current zoning requirements of the County into conformance with the adopted elements of the County General Plan.
- 1979-1981 Adoption of the Housing Element and Growth Management System which described the type and rate of residential development in the unincorporated area.
- 1982-1983 Update (of the Land Use, Housing, Conservation, Open Space, Seismic Safety, Growth Management System and School Facilities Elements) and completion (of the Safety, Circulation, Scenic Highways and Noise Elements) of the Napa County General Plan to provide for an equitable balance between requirements for resource preservation and urban development needs of the County.

HOW THE GENERAL PLAN IS ADOPTED AND AMENDED

The 1983 Comprehensive Napa County General Plan was adopted following scores of public hearings, meetings and study sessions conducted by the Napa County Board of Supervisors and the Conservation, Development and Planning Commission during 1982 and 1983. The Plan will undergo comprehensive re-evaluation again in 1992 and selective review at more frequent intervals as needed. For example, the Housing element is required by State law to be revised by July 1, 1984.

With certain exceptions, State law limits the number of times a mandated general plan element can be amended to three times in any calendar year. The process of amending the Napa County General Plan is as follows:

1. An amendment is proposed by either:
 - a) An individual or a group (requires the payment of all applicable fees).
 - b) Board of Supervisors
 - c) Conservation, Development and Planning Commission
 - d) Conservation, Development and Planning Department
2. The Conservation, Development and Planning Department conducts an Initial Study of the possible environmental impacts of the proposed amendment and determines what environmental action is required.
3. The Conservation, Development and Planning Commission holds an advertised public hearing at which time the public can comment on the proposed amendment, the Department's report and the environmental review. If the Commission decides to approve the proposed amendment, it does so by resolution.
4. The Board of Supervisors holds an advertised public hearing at which time the public can comment on the proposed amendment, the Commission's report and the environmental review. If the Board decides to adopt the proposed amendment, it does so by resolution; at which point the General Plan Change is completed.

The amendment process (Steps 1 through 4) typically takes about six months to complete.

RELATIONSHIP TO OTHER PLANNING ACTIVITIES AND ACTION PROGRAMS

The Napa County General Plan is the focus of County policies regarding land use and numerous other related planning activities and actions.

1. Some related activities and actions are required to be consistent with general plans, such as:
 - a) Zoning ordinances, Variance procedures and Use Permits.
 - b) Subdivision ordinances.
 - c) Development agreements.
 - d) Capital improvement plans.
 - e) Area plans (e.g., Napa Valley Area Plan, Lake Berryessa Area Plan).
 - f) Specific plans (e.g., Napa County Airport Industrial Area Specific Plan).
 - g) Special purpose plans (e.g., Napa County Park and Recreation Plan, Napa County Solid Waste Management Plan, Napa County Transportation Development Plan).
2. Some activities and actions although separate from the Plan may impact on it, such as:
 - a) Napa County Airport Land Use Plan.
 - b) California Environmental Quality Act Guidelines.
 - c) General plans of adjacent cities and counties.
 - d) Regional housing needs allocation.
 - e) Regional plans (e.g., Regional Transportation Plan).
 - f) Social plans (e.g., criminal justice plans).

HOW THE COUNTY IMPLEMENTS AND USES THE GENERAL PLAN

State law requires that general plans be implemented and that land use regulations be consistent with the general plan. The State's administrative guidelines indicate that:

"...an action, program or project is consistent with the general plan if it, considering all its aspects, will further the objectives and policies of the general plan and not obstruct their attainment."

The Napa County General Plan is implemented by both County actions and individual proposals.

County actions could include initiating the following:

1. Preparing and adopting a Napa County Airport Industrial Area Specific Plan.
2. Rezoning land for consistency with the General Plan (as required by law).
3. Establishing a County Housing Authority, and encouraging the construction of "granny apartments"; as means of implementing the Housing Action Program.
4. Updating subdivision regulations including improvement standards (e.g., road improvements and fire safety requirements).
5. Preparing annual reports on the status of the General Plan and progress in its implementation.

In a reactive sense, the County uses its General Plan by:

1. Responding to draft plans prepared by adjacent cities and counties or regional agencies (e.g., adjusting local shares of "regional housing needs").
2. Reviewing subdivision, development, use permit and variance proposals for their conformance with the General Plan (as required by State law).

HOW TO USE THE NAPA COUNTY GENERAL PLAN

As a concise statement of County Policies, the Napa County General Plan enables an individual to readily identify the consensus on County Planning which has evolved over many years, through numerous public hearings and meetings. The resulting consensus has been translated into the adopted General Plan Goals and Policies, which describe the Napa County of the Future.

In that regard, the Napa County General Plan is a helpful guide for anyone interested in living, investing, working or visiting in the County. People inquiring into the possible and reasonable future uses of their property, or the future character of their neighborhood, can also consult the General Plan and appropriate zoning and other ordinances and determine within the broad categories of urban, agriculture, industrial and commercial, the answer to their question. Since the actual designation of land use areas as contained in the general plan is conceptual rather than parcel specific, some additional interpretation is required. However, the diagram may be used to roughly identify the boundaries of a given land use classification. The location of such boundaries is usually refined by reference to utilities and natural boundaries such as rivers, watersheds, soil types, and various terrain features as well as reference to railroads, highways, and other man-made features.

Finally, the General Plan is an inventory of and an access guide to available information of use to anyone interested in the preservation and development of Napa County.

6/7/83

LAND USE



GENERAL PLAN

1. INTRODUCTION

Good Planning practice and State law both recognize the necessity of including a guide for land development in each county's plan for the future. The Land Use Element of the Napa County General Plan depicts the development pattern and distribution of activities that will best meet the County's needs to the year 2000. The Plan covers a time period of 18 years and presents a picture of the physical environment of today's citizens, as well as that of future generations.

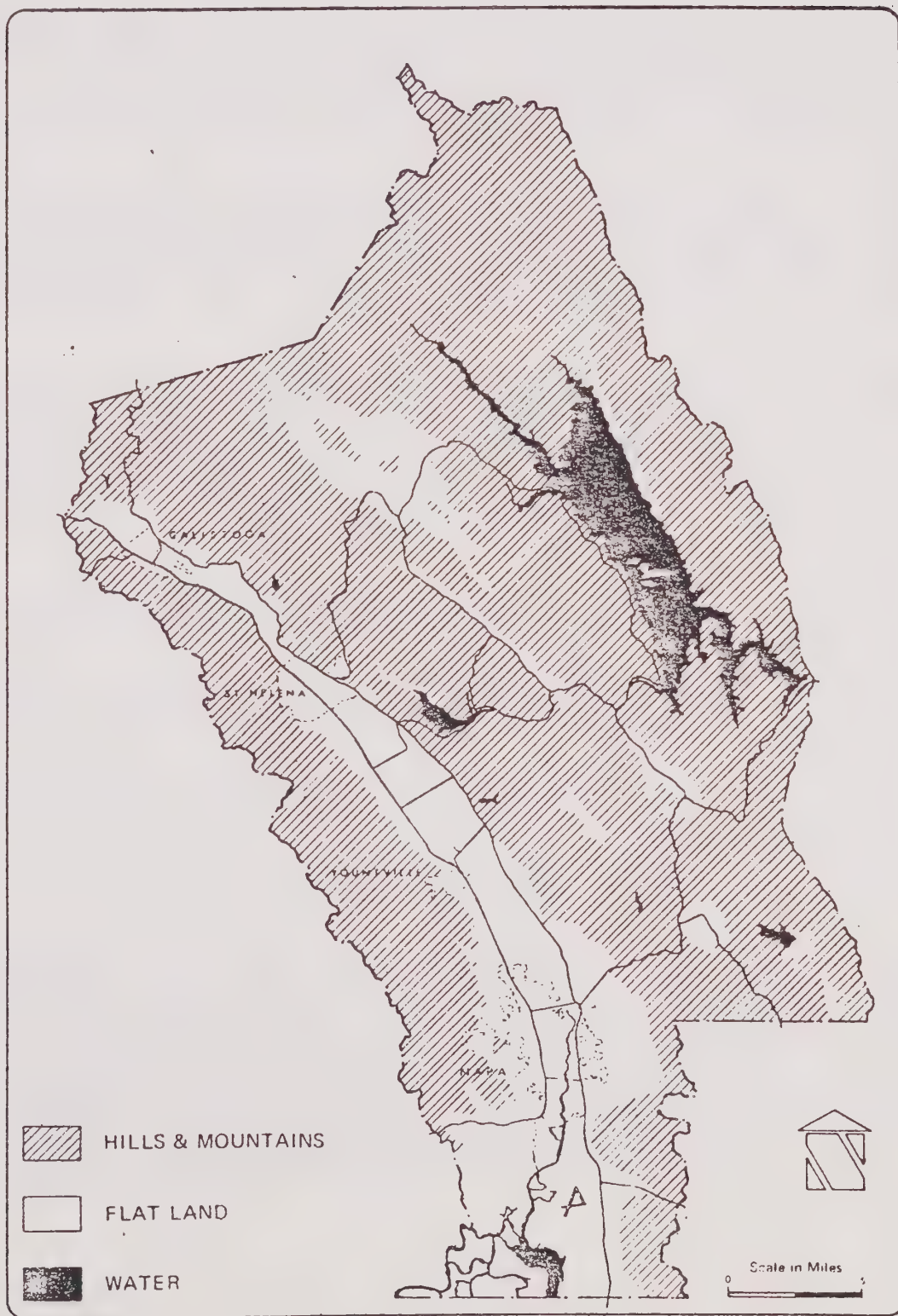
The 1982 Land Use Element updates the 1975 Land Use Element; incorporates subsequent amendments to the Napa County General Plan, changes in the County's data base, and changes in land use policies; accounts for public input and policy statements resulting from the 1977-1980 Rezoning for General Plan-Zoning Consistency; and implements the directives of the voter approved 1980 Slow Growth Initiative Measure A.

Planning concepts incorporated in the Land Use Element also reflect the results of comparative considerations made of the natural characteristics of the land area of the County. The primary objective of the overall approach that has been used in preparing the Land Use Element has been to achieve a balance between man's activities, the forces of nature, and the capability of the land in the County. The Land Use Element includes recommendations on various land use activities including:

- What types of land should remain in open space use to preserve nature, allow continued resource production, and protect the public health and safety.
- What land should be reserved for agriculture, and how that preservation can be accomplished, so that farms and ranches can continue to be a vital part of the County's economy and life style.
- Where and at what annual rate people may build houses with some assurance that the sites they choose will be compatible with the surrounding area and won't expose them or the community to unwarranted economic or environmental impacts.
- Where to place commercial and industrial enterprises for the combined advantage of developers, users, and the environment.

Achievement of the land use recommendations will produce the kind of County which the citizens, the voters, the Planning Commission and the Board of Supervisors have indicated they desire in the future. However, it is important to keep in mind that the Plan, as adopted, is not a rigid unchangeable document. Indeed, future commissions and boards of supervisors will re-evaluate the Land Use Element at least once every ten years to eliminate obsolete references, add new information, reconsider the goals and related policies, and consider the effectiveness of the Plan in achieving the desired goals, as well as the desired physical, social and economic form of the County. The next such review will be initiated in 1992.

FIGURE 1: MAJOR PHYSICAL FEATURES OF NAPA COUNTY



6/7/83

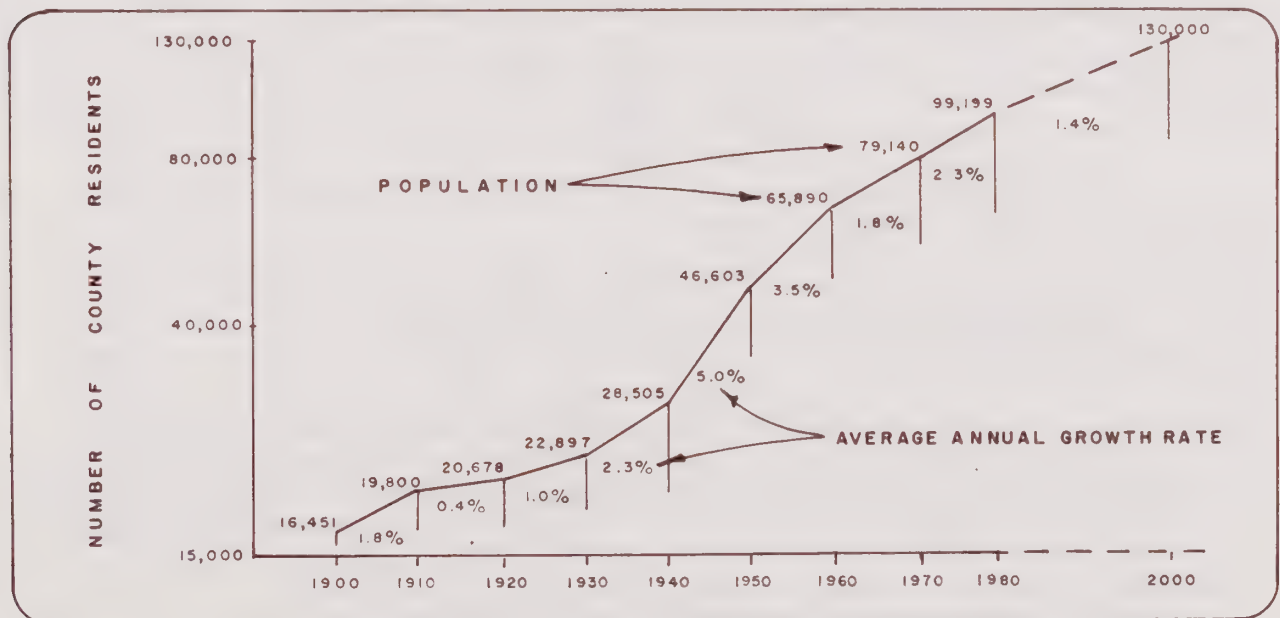
2. HISTORICAL TRENDS IN POPULATION, EMPLOYMENT AND LAND USE

Population

Napa County's 513,000 acres of land and water consist mostly of mountain ridges and narrow valleys stretching across the County on a northerly-southerly axis. Scarcely one-third of the land in the County is level enough for conventional development, and only a little of the level land is located along the main east-west route connecting major population centers located outside of the County. Due largely to these reasons, Napa County still retains much of its rural character and agricultural productivity.

Napa County's earliest residents were Indians who lived as hunters and gatherers, depending on wildlife and native plants for food. The Indian population is not believed to have ever exceeded 5,000 persons. By 1900, Mexican and American settlers moving into the Napa Valley increased the population to 16,000 persons. Agriculture, plus a small amount of industry, were the main means of support. The continuing increase in the County's population through 1980 is shown on Figure 2, along with a population forecast for the year 2000.

FIGURE 2: NAPA COUNTY POPULATION & FORECAST GROWTH RATE (1900-2000)



The year 2000 population forecasts and growth rates are based on population expectations contained in adopted General Plans of Napa County and its constituent cities, as shown in Figure 3.

FIGURE 3: YEAR 2000 POPULATION FORECASTS

JURISDICTION	YEAR 2000 POPULATION	ANNUAL GROWTH RATE (1980-2000)
Calistoga ①	5,000	1.3%
St. Helena ①	7,900	2.4%
Yountville ①	5,000	2.8%
City of Napa ②	75,000	2.0%
American Canyon ③ ④	8,000	1.7%
Unincorporated Remainder ③ ④ ⑤	29,000	0.9%
County Total. ④	130,000	1.4%

Notes:

- ① City/Town General Plan
- ② City General Plan; population forecast includes 6,777 residents in County islands inside the City of Napa Rural Urban Limit (RUL) Line. Annual growth rate, ignoring island population, would be 1.5%.
- ③ Assumes construction of approved development "grandfathered" in the Growth Management System Interim Element of the General Plan.
- ④ Approximate numbers.
- ⑤ Excludes American Canyon and County islands inside R.U.L.

Source: CDPD and adopted general plans

Local population growth is affected by a number of related factors which can be grouped under three primary headings:

- a) Natural increase
- b) National-regional population migrations
- c) Government policies

- a) Natural increase is the figure obtained from comparing the number of births and deaths in a given population over a given period of time. The natural increase figure for Napa County is not useful in predicting population changes due to the influence of the large resident populations at Napa State Hospital, the Yountville Veterans' Home and the large number of nursing homes. However, the population of the United States as a whole is growing at a rate of approximately 1% per year; and the national population growth rate is forecast to taper off to 1/4 of 1% by the year 2050. By the year 2010, the natural increase is projected to drop to zero, after which the net increase in national population is expected to be equal to the level of immigration.

- b) National and regional population migration will affect Napa County because people move about in search of better physical, social and economic climates; and among the places people are moving to are the "Sunbelt," California, and Napa County. Napa County has been growing faster than the nation since the 1930s. Figure 4 shows relative annual population growth rates of the 1970s.

FIGURE 4: RELATIVE POPULATION GROWTH RATES

<u>1970 - 1980 ANNUAL POPULATION GROWTH RATE</u>	
JURISDICTION	GROWTH RATE
United States	0.9%
California	1.7%
9 Bay Area Counties	1.1%
Napa County	2.3%
Cities *	3.7% (3.2% without annexations)
Unincorporated *	0.3% (1.1% without annexations)

* Annexation of approximately 3,000 residents during the 1970s distorts City and County growth rates.

Source: 1970 and 1980 U.S. Census, CDPD

Moreover, as the Central and South Bay counties become increasingly populated to the point of being crowded and as localities such as Vallejo use their supply of developable land, there is likely to be an increasing number of people in the Bay Area desiring to move to the lesser populated northern counties, such as Sonoma and Napa. The thrust of State law is to require accommodation of population migration; the local population forecasts in Figure 3 show that Napa County, as a whole, expects to accommodate this migration and accept its share of National, State and regional population growth.

- c) All levels of government establish policies affecting population growth (or decline), whether through direct means (e.g., national immigration policy and Measure A) or indirect means (e.g., money supply policy, mortgage insurance, tax incentives, public works project funding, and zoning). Slow Growth Initiative Measure A, adopted by voters in November 1980, mandates that "the annual number of new housing units permitted in the County of Napa (unincorporated area), through the year 2000, shall be limited to accommodate an annual population growth rate that shall not exceed (either) that of the nine San Francisco Bay Area Counties... (or) 1%." That growth rate translates to 134 dwelling units per year, as described in the Growth Management System Interim Element of the General Plan.

Employment

a) Historical Trend

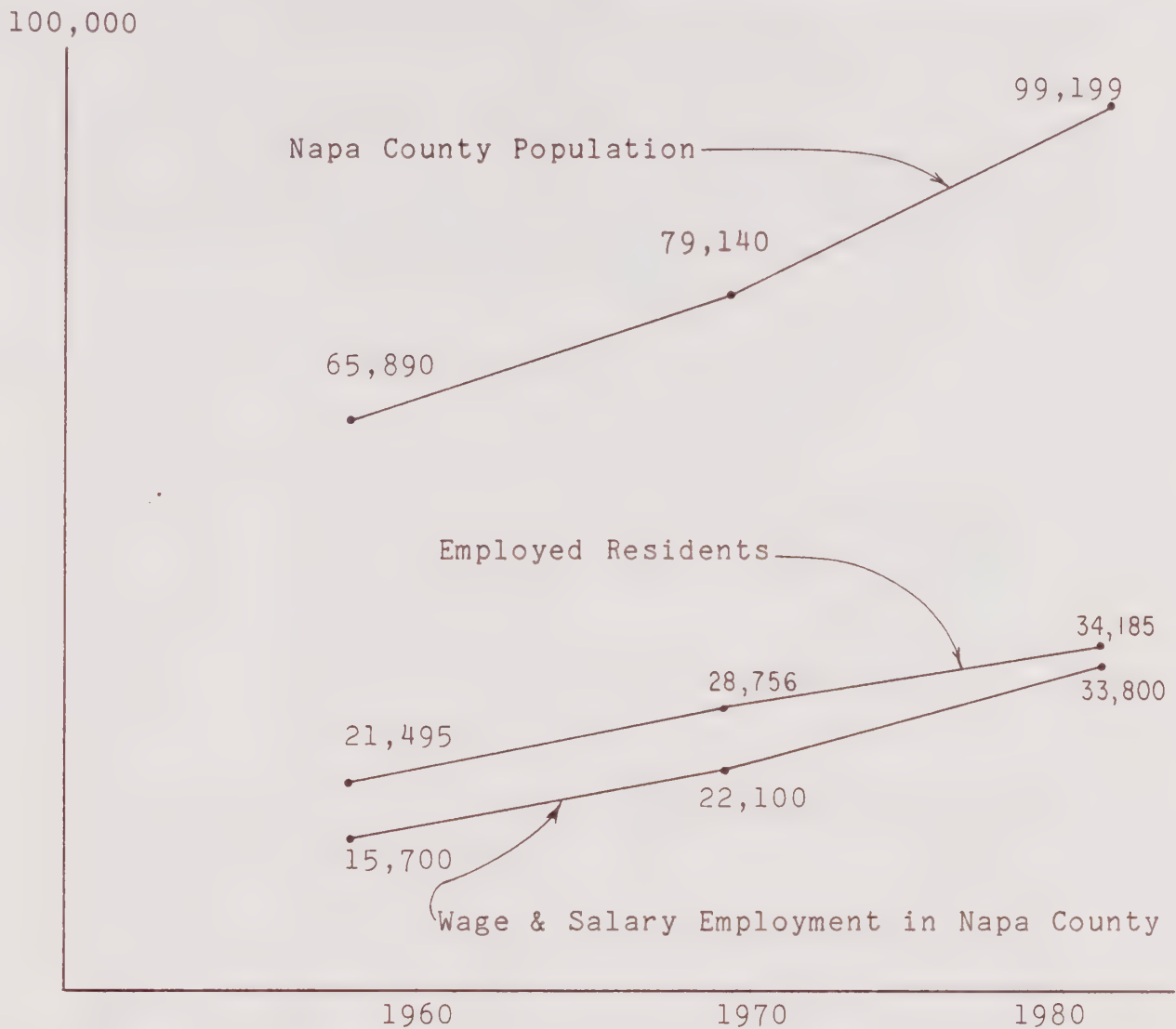
Figure 5 illustrates the historical comparison of Napa County's:

- o population (residents)
- o employed residents (every resident who works, regardless of where)
- o wage and salary employment located in Napa County

Figure 5, including the percentage comparisons below the graph, describes a relatively healthy and growing local economy in which:

- o LOCAL EMPLOYMENT IS GROWING FASTER THAN POPULATION.
On a per capita basis, growth in local employment opportunities has outpaced the combined effect of population growth and labor force growth, which increases the chance for a local resident to find a local job. In 1970, about 30% of all employed Napa County residents worked outside Napa County. In 1975, about 25% commuted out-of-County. (Actual out-of-County commuting always exceeds necessary commuting.)
- o THE PROPORTION OF RESIDENTS WHO WORK HAS BEEN RELATIVELY STABLE IN THE LAST 20 YEARS, not withstanding that the labor force participation rate of women is higher now than in the past, and that a greater proportion of people are between 16 and 65 years of age.
- o NAPA COUNTY TYPICALLY HAS A LOW UNEMPLOYMENT RATE.
During the years 1975-1979, Napa County's unemployment rate was lower than that of the Vallejo-Fairfield-Napa SMSA, San Francisco-Oakland SMSA, California and the United States.

FIGURE 5: POPULATION AND EMPLOYMENT IN NAPA COUNTY:
1960, 1970, 1980



<u>COMPARISON</u>	<u>1960</u>	<u>1970</u>	<u>1980</u>
WAGE & SALARY EMPLOYMENT	24%	28%	34%
POPULATION			
EMPLOYED RESIDENTS	33%	37%	34%
POPULATION			

Note: Figures include cities and unincorporated areas.

Source: CDPD; U.S. Census; California Employment Development
Department.

b) Types of Employment in Napa County

Napa County has a moderately diversified economy with a relatively stable economic base composed of agriculture (predominantly wine-related), manufacturing and educational/domiciliary/medical facilities of State-wide importance (P.U.C., California Veterans' Home and Napa State Hospital). Approximately 1/3 of all the jobs in Napa County are in this "economic base" category, which exports goods and services in exchange for the funds which drive the local economy. The remainder of employment in Napa County primarily serves the needs of local residents.

FIGURE 6: WAGE AND SALARY EMPLOYMENT IN NAPA COUNTY:
1960, 1970, 1980

TYPE OF EMPLOYMENT	1960	1970	1980
Nonagricultural Wage & Salary Workers (a)	13,700	20,500	31,100
Mineral Extraction	--	--	--
Construction (b)	800	900	1,300
Manufacturing	2,700	3,100	4,300
Durable Goods	1,300	1,500	1,800
Nondurable Goods	1,400	1,600	2,500
Food	500	700	1,500
Other	900	900	1,000
Trans., Comm., & Utilities(c)	900	1,200	1,300
Trade	2,500	3,800	6,100
Wholesale	200	200	700
Retail	2,300	3,600	5,400
Finance-Insur.-Real Estate	300	600	1,000
Services	2,400	4,400	8,200
Government (d)	4,100	6,500	8,800
Federal	100	200	300
State and Local	4,000	6,300	8,400
Agricultural (e)	2,000	1,600	2,800
TOTAL	15,700	22,100	33,800

(a) Employment reported by place of work. Does not include persons involved in labor-management trade disputes.

(b) Includes employees of operative builders.

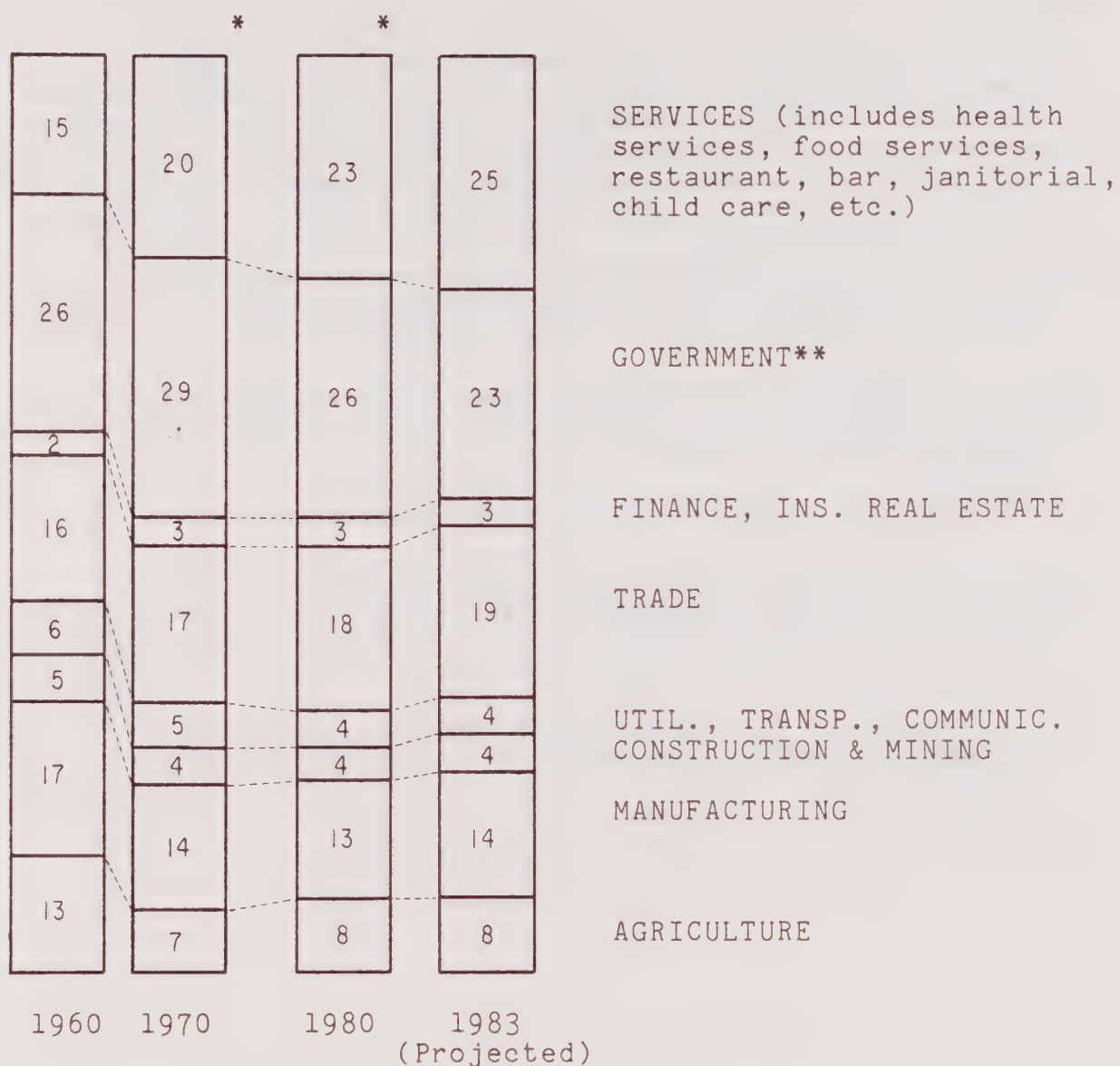
(c) Excludes employees of operative builders.

(d) Includes all civilian employees of Federal, State, and local governments regardless of the activities in which the employees are engaged.

(e) Includes farmers, employees and unpaid family workers.

SOURCE: California Employment Development Department

FIGURE 7: PERCENT EMPLOYMENT IN NAPA COUNTY, BY SECTOR;
1960, 1970, 1980, 1983



SOURCE: California E.D.D.

* Rounding errors.

** Federal and State employment (e.g. N.S.H. & Vet's Home) account for half of government employment.

Figures 6 and 7 indicate that, in 1980:

- o Government, including Napa State Hospital and the Yountville Veterans' Home, represented 26% of the jobs in Napa County. (Employment at Travis Air Force Base and Mare Island Naval Shipyard, both located in Solano County, represented a large proportion of out-of-County employment.) Government employment, which used to dominate Napa County's economy, is losing that dominance to service employment.
- o Service employment was the County's second largest industry; it provided 23% of local employment in 1980 and is projected to expand in the future, particularly as tourism expands.
- o Trade, both wholesale and retail, employed the third largest amount of the work force (approximately 18%) and is also expected to increase as tourism increases.
- o Manufacturing provided 13% of the local employment.
- o Agriculture provided 8% of local employment. Napa County's agricultural employment increased about 6% per year during the 1970s at a time when State-wide agricultural employment declined about 1/4 of 1% per year.
- o Construction and mining industries provided 4% of the local employment, as did the combination of transportation, communication and utilities.

c) Trends for the Future

- o Agriculture (primarily viticulture) will increase as a primary industry in the County. Napa Valley varietal grapes are anticipated to continue being highly valued for premium wines. The land area in grape production will increase as vineyards expand in Napa Valley, Pope, Congress and Chiles Valleys, Carneros, Coombsville and hillside areas. As viticultural technology improves, more lands will be seen as suitable for plantings, as happened in Carneros in the 1970s. Appellation control, Proposition 13 taxing limits, and the County's policies and zoning standards for Williamson contracts, Agricultural Preserve (AP), and Agriculture Watershed (AW) Districts enhance the prospect for successful long-term agricultural development.
- o Wine country tourism, fostered by the growing world-wide reputation of Napa County wines and the locale's scenic attractiveness is forecast to increase visits to wineries and improve the market for additional restaurants, lodging places, and tourist-oriented retail establishments, resulting in additional services employment.
- o Industrial development is forecast in the Napa County Airport industrial area. A large portion of the area is zoned for industry, is accessible by air, rail, highway and water transportation, and is served/serviceable by water and sewer lines. By protecting the County Airport from residential development, when residential uses have encroached on similar facilities elsewhere, the County has improved the aviation-related industrial potential of the Airport area. While the southern portion of the County has apparently come of age for warehousing development and the prospects for industry such as food processing, manufacturing, and assembling locating there are good, the rate at which the anticipated growth will occur is dependent upon a large number of unpredictable variables.

- o Trade and services in the County are expected to reflect the national trend to grow at a faster rate than the population as a whole. Educational/domiciliary/medical facilities such as Pacific Union College, Yountville Veterans' Home, Napa State Hospital, St. Helena Hospital, Queen of the Valley Hospital and rest homes/retirement facilities are expected to continue providing a part of the County's long-term economic base.
- o Finance, insurance, real estate, utilities, transportation, communication, construction and local government are expected to expand in relation to the population levels they serve.

Overall, the gains in employment in the local market sector and the increasingly self-sufficient character of the trade and service industries should lead to more diversity in the County's employment and industry.

d) Commuting

A review of the commuting activities between Napa County and the balance of the Bay Area shows that while Napa County is located away from the main centers of activity, about 25% of all employed Napa County residents in 1975 worked outside Napa County. One out-of-County commuter in three (nearly 2,000) was willing to commute 60-80 miles a day in order to live in Napa County. Since 1950, improved highway access to the Bay Area and adjacent North Bay Counties has reduced commute time to employment centers with a potential of a half-million jobs. While the commuters represent a large proportion of Napa County's work force, they only represent 1/4 of 1% of the 780,000 persons employed in Solano, Contra Costa, Alameda, Sonoma and Marin Counties. Therefore, even a minute change in the proportion of North Bay Area workers who might decide to move to Napa County could have a substantial impact on the local demand for housing and other population related land use activities. Commuting decisions are strongly influenced by the following factors:

- o Transportation facility improvements linking residential and employment areas (e.g., BART and the Route 29 "Southern Crossing") are typically followed by increases in the number of commuters using those improvements. Conversely, traffic congestion, increases in fuel costs, or recurrent fuel shortages increasing the cost of commuting, decreases the number of commuters.
- o The current urban problems identified with large cities (i.e., crime, pollution and rundown areas) will continue to make suburban areas attractive for residential development.
- o The escalation of the cost of living will be a significant factor in commuting decisions, costs of owning and operating a vehicle and the costs of owning or renting various types of housing.
- o Local, State and Federal policies which encourage or retard development by regulating the availability and cost of money, labor, land, building materials, and environmental protection measures, all affect the housing market. Local government can influence only some of these conditions.

- o Land availability depends on planning, zoning, financing and other market influences. The number of possible home sites in the unincorporated area of Napa County is shown in Figure 9.
- o The physical attractiveness of Napa County appears to be one of the predominant reasons, along with the availability of housing within commuting distance of large job centers, why so many workers are willing to commute. In many cases, the amenities outweigh the expense and inconvenience of commuting. However, the relative attractiveness of the area could be a self-defeating feature. If the attractiveness encourages people to move into the area in such numbers or at such a rate that its resources are overused, or that it becomes indistinguishable from the crowded places the commuter moved away from, the area loses its appeal and people no longer want to move there or live there. Napa County, to preserve the open agricultural character and stabilize the rate of urban growth at a desired level, may opt to limit utilities, facilities and services for housing, and highway improvements in the unincorporated area.

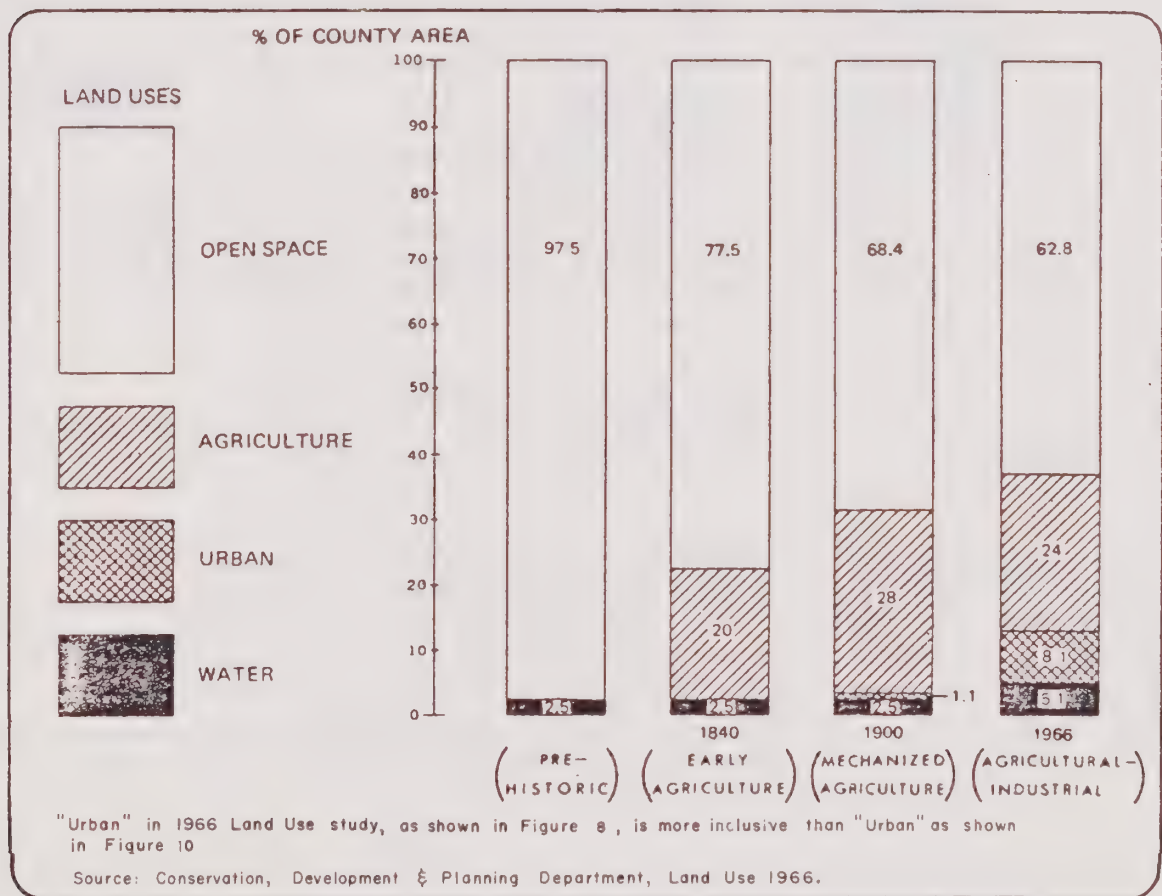
Napa County is fortunate in that it has recognized the quality of its unique character before most of it has been lost. Other California counties that have undergone rapid growth and experienced a decline in the quality of their environment either did not recognize the changes taking place, or were unwilling or unable to cope with the rate of change. Voter reaction to the 1978 Population Advisory Vote and the 1980 Slow Growth Initiative Measure A indicate that voters in Napa County want limits on the rate of growth and the consequent changes in land use.

Land Use

a) Historical Trend

An historical perspective of land use in Napa County is shown in Figures 8 and 10, which compare the major land uses of four dates in the past with the planned year 2000 land use distribution. The 1982 Land Use Element recommends stabilization of urban development and future population growth in the unincorporated area at an annual rate of 1%. At that rate, Napa County's unincorporated population growth rate would approximate that of the Nation and Region, and the total County population growth rate would approximate that of the State. The reasons supporting the land use distribution described in Figure 10 are described in the Goals section of Page 18. The means of accomplishing these goals are listed in the Land Use Planning Policies on Pages 19-31.

FIGURE 8: HISTORIC LAND USE IN NAPA COUNTY



b) Supply and Demand for Residential Building Sites in the Unincorporated Area

Figure 9 indicates that in the unincorporated area there is a relatively constant 20:1 ratio of residential building sites to the average number of new homes built each year, and that each year since 1973 the County has been approving 20% more new sites than have been used. (It should be noted that an undetermined number of existing vacant "building sites" may be unbuildable, or not for sale.) Since Measure A constrains the actual housing construction rate (demand) (years 1981-2000) to an annual average of 197 new homes, the County could reduce the rate of building site formation (e.g., parcel maps, etc.) by 20%, and still maintain a 20:1 ratio of vacant building sites to annual demand for building sites in the unincorporated area. (See explanation below.)

FIGURE 9: SUPPLY AND DEMAND FOR BUILDING SITES IN THE UNINCORPORATED AREA, 1970-2000

4630 VACANT BUILDING SITES EXISTED OUTSIDE CITIES, IN 1981:

Includes all vacant, non-commercial and non-industrial unincorporated parcels according to Assessor's use codes and computer program PLA 050 (10/19/81). While it is uncertain what proportion is buildable, a random sampling suggests 4/5 are. Over 1000 of these parcels are large enough to be split even at a 40 acre minimum lot size.

240 NEW BUILDING SITES HAVE BEEN APPROVED EACH YEAR, 1973-1981:

Parcel maps, subdivisions, mobilehome parks, planned developments and farm labor quarters approved between July, 1973 and September, 1981 have added 240 highly probable building sites per year. There is a higher probability that new parcels are buildable than existing parcels, due to the historically rising standards required in the subdivision process.

201 NEW DWELLING UNITS HAVE BEEN BUILT EACH YEAR, 1970-1981:

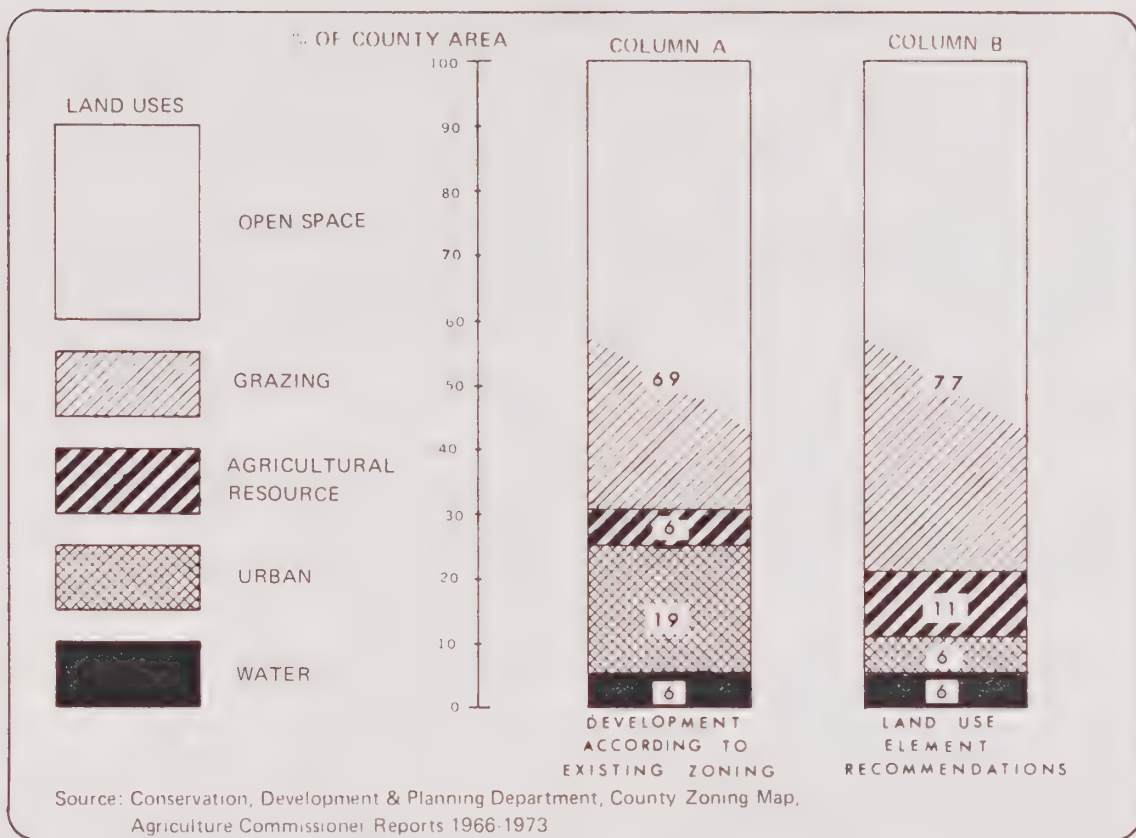
Building records for the unincorporated area indicate an annual average of 201 dwelling units (of the sort that would be subject to Napa County's Growth Management System) have been built since January, 1970.

THE FORECAST ANNUAL DEMAND IS 197 BUILDING SITES, 1981-2000:

An annual average net increase of 197 dwelling units will be permitted in the unincorporated area between 1981 and 2000 pursuant to the Growth Management System which implements Measure A. The 197 number equals the "annual allocation" of 134 d.u., plus 1/20 of the 1256 "grandfathered" d.u..

SOURCE: CDPD, Assessor's records, building permit records

FIGURE 10: COMPARISON YEAR 2000 LAND USE DISTRIBUTIONS



3. LAND USE PLANNING FOR THE YEAR 2000

A. GOALS

The first part of the plan described existing conditions and trends. The remainder of the Land Use Element describes what is recommended to influence the future use of land within Napa County.

Following a review of the response analysis of the 1974 Summary General Plan Report, the Napa County Board of Supervisors and the Napa County Conservation, Development and Planning Commission adopted the first four Land Use Planning Goals to guide the County's future and to use in the preparation of the various elements of the County's General Plan. Goal 5 was added in 1982. Literally thousands of Napa County's citizens have taken part in developing these planning Goals.

- GOAL 1 - TO PLAN FOR AGRICULTURE AND RELATED ACTIVITIES AS THE PRIMARY LAND USES IN NAPA COUNTY AND CONCENTRATE URBAN USES IN THE COUNTY'S EXISTING CITIES AND URBAN AREAS.
- GOAL 2 - TO DEVELOP AND IMPLEMENT A SET OF PLANNING POLICIES WHICH COMBINE TO DEFINE A POPULATION SIZE, RATE OF POPULATION GROWTH AND THE GEOGRAPHIC DISTRIBUTION OF THAT POPULATION IN SUCH A MANNER THAT THE DESIRED QUALITY OF LIFE IS ACHIEVED.
- GOAL 3 - TO DETERMINE WHAT THE LAND IS BEST SUITED FOR; TO MATCH MAN'S ACTIVITIES TO THE LAND'S NATURAL SUITABILITY; TO TAKE ADVANTAGE OF NATURAL CAPABILITIES AND MINIMIZE CONFLICT WITH THE NATURAL ENVIRONMENT.
- GOAL 4 - TO WORK WITH CITIES, OTHER GOVERNMENTAL UNITS, CITIZENS AND THE PRIVATE SECTOR TO PLAN FOR SERVICES, FACILITIES AND ACCOMMODATIONS, INCLUDING HOUSING, TRANSPORTATION, ECONOMIC DEVELOPMENT, PARKS AND RECREATION, OPEN SPACE AND OTHER TOTAL COUNTY NEEDS.
- GOAL 5 - TO IMPLEMENT THE GENERAL PLAN IN EVERY POSSIBLE WAY TO
 - (A) ENSURE THE LONG-TERM PROTECTION AND INTEGRITY OF THOSE AREAS IDENTIFIED IN THE GENERAL PLAN AS AGRICULTURAL, OPEN SPACE OR UNDEVELOPABLE.
 - (B) STIMULATE THE DEVELOPMENT OF THOSE AREAS IDENTIFIED IN THE GENERAL PLAN FOR RESIDENTIAL, COMMERCIAL AND INDUSTRIAL.

B. POLICIES

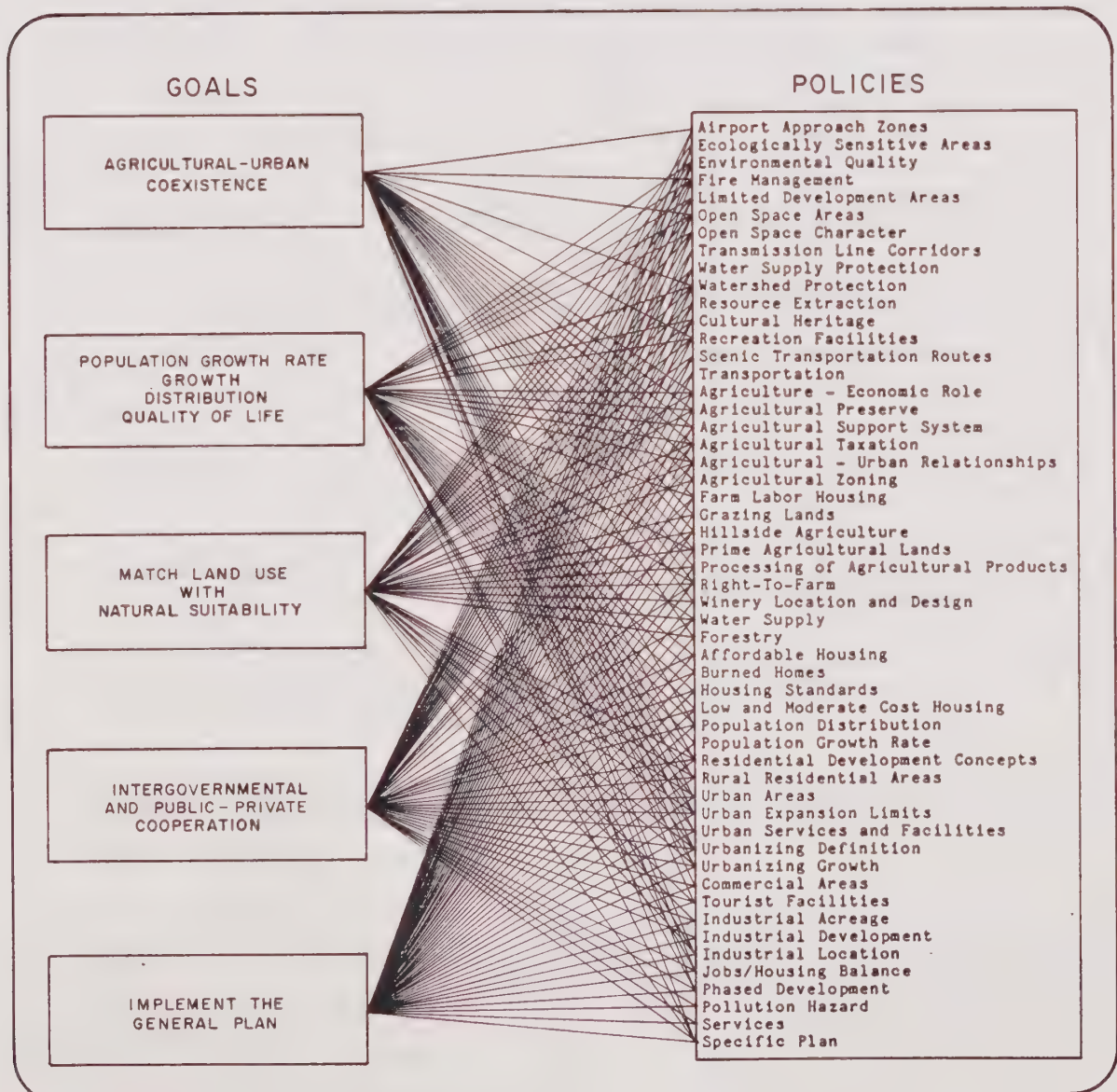
Each of the General Planning Goals provides the basis for numerous specific planning Policies. Many of the Policies are related to more than one Goal, as shown in Figure 11.

The Policies describe a set of actions or positions which will be taken in relation to the day-to-day decisions which the County will be making. By coordinating their land use decisions through adherence to Policy Guidelines, the Board of Supervisors, Conservation, Development and Planning Commission, County departments and agencies will be better able to produce the type of environment the public has said it wants.

The planning Policies listed in Figure 11 are described and related to land use issues on Pages 20-31. A close study of the Policies will reveal that many address several issues. Issues are grouped under the following headings:

- | | | |
|----------------------------|--------------|---------------|
| o Open Space and Watershed | o Recreation | o Agriculture |
| o Residential | o Commercial | o Industrial |

FIGURE 11: GOALS - POLICIES RELATIONSHIP



C. LAND USE ISSUES AND LAND USE POLICIES

1) OPEN SPACE AND WATERSHED ISSUES

Future interactions between man and the natural environment are the heart of open space and watershed issues. The intent of this section of the Land Use Element, as noted in Goal 3, is to enhance the man-environment relationship. In that regard Urban activities throughout the Bay Area, including Napa County, have impacted on the current quality of living in the country and its open space character. Most of the approximately 130,000 persons who will live in Napa County by the year 2000 will live in incorporated cities, and therefore it is anticipated that most of the land in Napa County will be open space. Open space is described in the adopted Conservation and Open Space Element of the General Plan as including the following uses:

- o Managed production of resources (forest, rangeland, agriculture, ground water recharge, fisheries and major mineral deposits).
- o Public health and safety (earthquake fault zones, unstable soil areas, flood plains, high fire risk areas and water reservoirs).
- o Outdoor recreation (outstanding scenic, historic and archeological values; access to rivers and streams; links between major recreation and open space reservations, including utility easements, banks of rivers and streams, trails and scenic highway corridors).
- o Preservation of natural resources (plant and animal life, habitat for fish and wildlife, areas required for ecological and other scientific study purposes, rivers, streams, estuaries, lakeshores, banks of rivers and streams and watershed lands).

Open space and watershed issues to which the Land Use Element relates include:

- o How can public health and safety best be served?
- o How can an equitable balance between those benefiting and those paying be achieved?
- o How can irreplaceable resources be preserved?
- o How should renewable resources be managed?

OPEN SPACE AND WATERSHED POLICIES

- 1.1 Airport Approach Zones - The County will consider low density non-residential development of land such as industrial under Airport Approach Zones to reduce safety hazards through the use of zoning or acquisition of development rights.
- 1.2 Ecologically Sensitive Areas - The County will enact and enforce regulations which will limit development in ecologically sensitive areas such as those adjacent to river or streamside areas, and physically hazardous areas such as floodplains, steep slopes, high fire risk areas and geologically hazardous areas; except for Oat Hill which is planned for urban development.
- 1.3 Environmental Quality - The County will enact and enforce regulations which will maintain or improve the current level of environmental quality found in Napa County.
- 1.4 Fire Management - The County will develop a controlled-burn program for managing fire hazardous areas, to reduce wildfire hazard, improve watershed capabilities, promote wildlife habitat diversification, and improve grazing.
- 1.5 Limited Development Areas - The County will retain in large parcel sizes watershed supply areas, floodplains or relatively isolated areas associated with public and semi-public uses and other areas, the best use of which is not yet determined. The County shall protect natural areas having slopes of 15% or more for airshed, watershed, wildlife habitat, nature areas and limited outdoor recreation, as well as for fire and erosion protection, and seismic safety; excepting Oat Hill in American Canyon.
- 1.6 Open Space Areas - The County will preserve suitable land for greenbelts, forest, recreation, flood control, adequate water supply, air quality improvement, habitat for fish, wildlife and wild vegetation and natural beauty. The County will encourage management of these areas in ways that promote wildlife habitat renewal, diversification and protection. It will enhance the open space character of the County through the development and use of open space and scenic easements and Williamson-type contracts.
- 1.7 Open Space Character - The County will retain the character and natural beauty of Napa County by the preservation of open space especially in areas close to cities (and not scheduled for urban development), hilly areas and outlying rural areas; excepting Oat Hill in American Canyon.
- 1.8 Transmission Line Corridors - The County will designate the general location of any major utility transmission corridors crossing the County to minimize economic and environmental impacts.
- 1.9 Water Supply Protection - The County will protect public and private water supply sources from contamination of overdrafts, and encourage groundwater recharge.
- 1.10 Watershed Protection - The County will protect the public interest in drainage systems and water impoundments from sedimentation, siltation, and contamination and ensure that urban, agricultural and resource development projects utilize sound short-term and long-term erosion control measures.

- 1.11 Resource Extraction - The County's resource extraction standards (e.g., mining and geothermal development standards) will emphasize environmental implications, such as air pollution, visual distractions, siltation of nearby streams, increase in surface runoff, removal of underground water by pumping, increase in erosion or landslide hazard, disposal of chemical wastes, creation of impervious layers and surface compaction, extent of vegetation removal and site rehabilitation procedures.

2) RECREATION ISSUES

More leisure time, increased expendable income and a growing awareness of the importance of exercise are prompting more people to seek outdoor recreation.

Government at the local level has some responsibilities to provide for the health and well-being of all persons in the community in the form of active and passive recreation facilities. The adopted 1976 Napa County Park and Recreation Plan concludes that:

In 1970, the residents of Napa County generated slightly less than half of the nearly 15 million participation days of outdoor recreation activity in the County. Most of the recreation activity related to wineries and Lake Berryessa, which tended to overload State Highways 29, 121 and 128. By the year 2000, resident participation will almost double. However, participation by non-residents is expected then to account for 53% of total participation.

The supply of regional day-use recreation in 1970 (for both residents and non-residents) was adequate as the result of opportunities available on lands owned by the State, the City of Napa and the private sector. However, private lands account for such a high percentage of regional day-use participation (77%) that it is not reasonable to assume that the needs of County residents were being satisfied (in 1970) to the extent that the raw figures indicate. High income families participate at much higher rates than families of more modest income, who are unable to afford frequent participation on lands provided by the private sector.

By the year 2000, unsatisfied demands for regional day-use recreation in Napa County will require 3,000 acres and \$23.35 million (excluding land acquisition).

Those opportunities which currently are in shortest supply include: hiking, horseback riding, bicycling, picnicking, and study and enjoyment of the natural landscape.

RECREATION POLICIES

- 2.1 Cultural Heritage - The County will encourage interest in the cultural heritage of Napa County for the education and enjoyment of present and future citizens to enhance the individual's sense of identity with the County. For that purpose the County will develop regulations and programs to preserve and utilize historical buildings and areas of historic significance, or scenic attractiveness.
- 2.2 Recreational Facilities - The County will plan for and reserve land for recreational facilities, and encourage private recreational development and other open space uses that are beneficial to the residents of Napa County as well as visitors to the County.
- 2.3 Scenic Transportation Routes - The County will plan for a high quality of design and visual appearance along all major and scenic designated transportation routes through such means as eliminating all billboards and, where practical, undergrounding utilities. The County will also encourage the development of a system of scenic roads, bicycle routes and hiking trails connecting existing cities and other local population centers to outdoor recreation and open space resources and facilities detailed in the Scenic Highways Element of the Napa County General Plan.
- 2.4 Transportation - As indicated in the Circulation Element of the Napa County General Plan, the County will promote the development of public transportation facilities for and between urban areas within the County for tourism to provide for more efficient service and to minimize the congestion and adverse ecological effects of heavy automobile traffic.

3) AGRICULTURAL ISSUES

In 1981, agriculture was one of the major contributors to the economy in Napa County, with a total value of all agricultural products of \$75 million. In addition to 2800 persons employed directly in agriculture in 1981, there were many more employed, indirectly, in wineries and support services related to agriculture and "wine country" tourism. Moreover, all residents benefit from taxes paid on agricultural lands, which require few public services. With 0.5% of California's land area, Napa County produced 0.6% of California's agricultural gross income in 1981. Wine grapes and grapevine nursery stock contributed 80% and beef, milk and egg production contributed 13% of the County total. The remaining 7% was attributed to other crops and animal products. Viticulture became the preeminent agricultural activity in Napa County during the 1970s; but historically and currently there is more to local agriculture than viticulture.

In the 1970s, the largest increase in crop value was in wine grapes, due to increased value per ton and greater acreages in grapes. While some growers are concerned about the impact of the additional acreage planted with grapes which are not yet in production, most feel that Napa Valley's unique soils and micro-climate will continue to bring premium prices for Napa Valley varietal grapes. Although other areas can produce wine, it is difficult to equal the combination of quality grapes and vintners' art which has created a world-wide reputation for the excellence of Napa Valley varietal wines. As the growers' technology improves, grapes are being planted in Carneros; Congress, Pope, Chiles and Capell Valleys, Coombsville and various hillsides which were previously considered impractical for viticulture. The 1980s should see extensive planting on terraced hillsides surrounding Napa Valley, calling for prudent soil management practices.

The Napa Valley and surrounding area is an irreplaceable viticultural resource; the characteristics of climate, soils and hydrology that make it one of the finest grape growing regions in the world would be impossible to duplicate if one or more of these characteristics were impaired or destroyed by urbanization. The impacts of urbanization are, for all practical purposes, irreversible. Productive farmland and urbanization are not compatible.

Napa County has long been aware of its unique agricultural resource. In 1968, increasing urbanization pressures, an awareness of the County's agricultural potential and a concern for the future of that agriculture led citizens' groups, growers and vintners, the County Planning Commission and the Board of Supervisors to establish one of the first Agricultural Preserves in the nation. Public support for the Agricultural Preserve and the size of the Preserve itself has increased since that time. The Napa Valley Agricultural preserve now contains over 29,000 acres; the Wooden Valley Agricultural Preserve now contains 2,200 acres.

AGRICULTURAL POLICIES

- 3.1 Agriculture-Economic Role - The County will enact and enforce regulations which will retain agriculture as a major source of income and employment in Napa County.

- 3.2 Agricultural Preserve - The County will initiate studies to evaluate means, methods, advantages and disadvantages of placing the existing agricultural preserve plus potential agricultural acreage under permanent land use protective controls. The County will develop additional types of Agricultural Preserves suitable for localized conditions in such places as Carneros, Coombsville and Congress, Foss, Gordon, Capell, Chiles and Pope Valleys; and hillside viticultural areas.
- 3.3 Agricultural Support System - The County will develop a coordinated plan to promote an agricultural support system including physical components (such as farm labor housing, equipment supply and repair) and institutional components (such as 4-H, FFA, agricultural education and experimentation).
- 3.4 Agricultural Taxation - The County will initiate studies of tax assessment policies which recognize the long term intent of agricultural zoning and the fact that agricultural land uses require a minimum of public expenditure for protection and servicing.
- 3.5 Agricultural - Urban Relationships - The County will develop planning concepts and zoning standards designed to minimize conflicts arising from encroachment of urban uses into agricultural areas. Land in proximity to existing urban areas currently in mixed agricultural and rural residential uses will be treated as Residential Country Areas and further parcelization of these areas will be discouraged. Day care centers will be allowed in agricultural areas where there is a finding there is and will be no conflict with agricultural use of the vicinity.
- 3.6 Agricultural Zoning - The County will establish minimum agricultural parcel sizes which reflect the availability of natural resources, in order to assure that agricultural areas can be maintained as economic units.
- 3.7 Farm Labor Housing - The County will develop standards in the General Plan Housing Element to allow agriculturalists to construct farm labor housing appropriate for the support of long-term agriculture.
- 3.8 Grazing Lands - The County will protect agricultural lands used for grazing, even though they may not be considered prime soils; excepting those lands south of Soscol Ridge which are shown in Figure 14 as planned for urban development.
- 3.9 Hillside Agriculture - The County, working in conjunction with the Soil Conservation Service, will monitor hillside agricultural operations, and in conjunction with the Soil Conservation Service, establish standards for terracing, contour planting, and maintenance of permanent cover crops on slopes exceeding 15%.
- 3.10 Prime Agricultural Lands - The County will reserve prime agricultural lands for agricultural use.

Amended 3.11 Processing of Agricultural Products - Agriculture includes the production and processing of food and fiber, the growing of crops, produce and feed as well as the raising of livestock and animals. In the case of wineries, by BOS processing includes tours and tastings, retail sales of wine produced by or for the winery partially or totally from 1-23-90 Napa County grapes, activities for the education and development of consumers and members of the wine trade with respect to wine produced by or at the winery, and limited non-commercial food service, provided any such activities are clearly accessory to the principal use of the facility as an agricultural processing facility. No other use or development of a parcel located in an agricultural area shall be permitted unless it is needed for the agricultural use of the parcel. The processing of agricultural products often takes on an industrial character which will be subject, in general, to the same kinds of regulations as other industrial uses.

- 3.12 Right-To-Farm - The County will affirm and protect the right of agriculture operators in designated agricultural areas to continue their agricultural practices, even though established urban uses in the general area may foster complaints against those agricultural practices. The existence of a "Right-To-Farm" policy will be indicated on all parcel maps approved for locations in or adjacent to designated agricultural areas.
- 3.13 Winery Location and Design - Wineries and related activities will, where practical, be located on sites off of prime soils areas and should be designed to convey the attractiveness associated with existing Napa Valley wineries.
- 3.14 Water Supply - The County will initiate studies to develop a comprehensive understanding of the potentials and deficiencies of surface and underground water supplies in Napa County.
- 3.15 Forestry - The County will encourage active forest management practices including timely harvesting to preserve existing forests. The County will encourage timber plantations for fuel wood production.

4) RESIDENTIAL ISSUES

The major reason for increased development demands in Napa County is its attractiveness as a place of residence rather than a place of employment.

The potential demand for housing in Napa County is magnified by the County's proximity to a half-million jobs, and the rapid utilization of vacant residential lands in alternate housing areas, such as Vallejo and Solano County.

Growth control became a widespread concern in the 1970s throughout the nation, and particularly in places such as Napa to which people were migrating. Because so many California cities and counties have opted to preserve their physical, social and fiscal circumstances by limiting residential growth, the State legislature has mandated that every city and county must accept their share of their region's housing needs. Napa County's implementation of Slow Growth Initiative Measure A, approved by voters in November 1980, allows for accommodation of the County's share of national and regional housing needs. Growth forecasts in the general plans of Napa County and its constituent cities, indicate a combined County-cities population growth rate which approximates the higher growth rate of the State. The general plans of all jurisdictions in Napa County indicate that urban development belongs in urban areas and there is sufficient space in existing cities and currently designated urban areas to accommodate the bulk of the 130,000 County residents forecast for year 2000.

Outside of the cities and existing urban areas, the lack of available public water supply, sewage disposal facilities and other public services and facilities necessitates the County limiting further non-agricultural residential development to avoid serious problems. Since protection of the agricultural, natural resource and open space lands is the primary goal of the Land Use Element, new residentially oriented development should be excluded from these lands. In areas that are identified for residential growth, the use of policies that encourage clustering, density transfer and enforceable restrictions on land use can aid in creating a wide range of housing choice, recreation opportunity and economies in development and usable open space. Various considerations discussed and illustrated in pages 19-31 act as development determinants which indicate where urban residential and related uses should and should not be located.

The questions of how much housing to provide and where it should be provided have largely been resolved; but how to make it affordable has not. In the early 1980s the housing industry was unable to supply new housing on terms the average citizen could afford. Measure A requires that 15% of residential permits be reserved for affordable housing; but the mechanism for getting it built is not in hand. Affordable housing is a national problem that must, in part, be solved locally.

RESIDENTIAL POLICIES

- 4.1 Affordable Housing - At least 15% of those dwelling units permitted each year in the unincorporated portion of Napa County shall be capable of purchase or rental by persons with average or below-average income. The average income shall be based on the average income of residents of the County of Napa, based on the most recent United States Census. (Added pursuant to Measure A, a citizen initiative passed in November 1980.)
- 4.2 Burned Homes - Legal residences destroyed by fire may be rebuilt within a year of most recent occupancy, whether or not they conformed to the zoning ordinance at the time of the fire.
- 4.3 Housing Standards - The County will maintain and improve the quality of the existing housing stock in the County through the establishment of minimum standards and enforcement programs as one means of meeting the County's housing needs.
- 4.4 Low and Moderate Cost Housing - The County will work with the cities to see that low and moderate cost housing is provided in proportion to the number of low and moderate income householders in Napa County.
- 4.5 Population Distribution - The County will plan for and accommodate the distribution of population among the sub-areas of the County, giving preference to existing incorporated and urban areas.
- 4.6 Population Growth Rate - The County will plan for an average annual combined County/City population increase comparable with national, state and regional growth rates. Pursuant to Measure A (a citizen initiative passed in November, 1980), the annual number of new housing units permitted in the unincorporated portion of Napa County, through the year 2000, shall be limited to accommodate an annual population growth rate that exceeds neither that of the nine San Francisco Bay Area Counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma and Solano), nor 1%. The most recent United States Census shall be used for determining population, persons per household, and the vacancy rate of year-round dwelling units.
- 4.7 Residential Development Concepts - The County will promote development concepts that create flexibility, economy and variety in housing without destroying the environmental amenities recommended in the General Planning Goals and Policies.

4.8 Rural Residential Areas

- a) Residential Country Areas - Deer Park and those Residential Country Areas adjacent to the City of Napa will be assumed to have a year-round residential orientation; further parcelization of these areas will be discouraged.
- b) Recreational Country Areas - The overall extent of residential and commerical development in the Capell Valley and Berryessa Areas will reflect the presumed recreational orientation and be different from the Napa Vicinity Residential Country Areas. In the Berryessa area, timing will be integrated with recreational policies promulgated by the Bureau of Reclamation, and State and Federal water quality standards which are likely to change in time.

Amended
3-22-88

- 4.9 Urban Areas - The County will assume that the density of development in the American Canyon Area and the Angwin Area precludes future subdivision activity based on septic tanks and wells. The Angwin Urban Area is Pacific Union College and adjacent commercial facilities.
- 4.10 Urban Expansion Limits - The County will work with the cities, special districts, and Local Agency Formation Commission to define and establish the limits of current and future urban expansion and development. Unincorporated land included within the Rural Urban Limit Line of the 1983 Napa City's General Plan will not be further urbanized without annexation to the City, except that day care centers will be allowed inside the RUL.
- 4.11 Urban Services Facilities - The County will oppose the creation of special districts planned to accommodate residential projects outside existing urban areas. The County will discourage proposed developments which require urban services and which are not proposed for urbanized areas. Existing utility systems will be used as much as possible to maximize the use of existing services and facilities and to provide a broader user base to insure the adequate maintenance and operation of such facilities. Where urban areas lack full urban services, the County will encourage means of area-wide provision of such services.
- 4.12 Urbanizing Definition - The term urbanizing shall include the subdivision, use, or development of any parcel of land that is not needed for the agricultural use of that parcel.
- 4.13 Urbanizing Growth - The County will enact and enforce regulations which will encourage the concentration of residential growth within the County's existing cities and areas designated for urban uses on the General Plan. However, nothing in the Land Use Element is intended to preclude the construction of a single family residence, day care center or private school on an existing, vacant, legal parcel of land, in compliance with adopted County ordinances and other applicable regulations.

Amended
7-12-88

5) COMMERCIAL ISSUES

With only limited residential development anticipated in the unincorporated areas of the County, the need for extensive commercial development is questionable. Commercial activities grouped in convenience centers and sized to the potential need would best serve the needs of local residents. Such facilities should be located in and adjacent to population concentrations, i.e., cities and urban areas. Tourist related commercial areas should be considered only when no city or urban alternative is planned. Commercial development which would impact adversely on traffic circulation or adjoining land uses, or which would not be served with public water and sewer, or which would induce growth should not be permitted in the unincorporated areas, except as previously described.

COMMERCIAL POLICIES

5.1 Commercial Areas

- a) American Canyon - Land within the American Canyon "Commercial" area will be a buffer area between the Plan's residential and industrial areas. Neither residential nor industrial uses will be allowed to encroach any further into this area without the guidance of a Specific Plan for American Canyon which might indicate mixed usage.

Deleted
7-12-88

- ~~b) Napa Vicinity - Unincorporated commercial land located inside the Rural Urban Limit Line of the Napa City's General Plan will not be further urbanized without annexation to the City, except that day care centers will be allowed inside the RUL.~~

Amended
7-12-88

- b) General - The County will encourage the grouping of commercial uses in compact areas designated for commercial uses on the General Plan; but not in areas designated for agricultural uses in the General Plan, subject to any exceptions prescribed in the text of the General Plan. The size of the combined commercial uses will reflect the potential market for such facilities and services. The central business district of each urban center will be recognized as the dominant commercial and financial center for the surrounding trade area. ~~The County will rezone parcels that are commercially zoned but not commercially developed to conform to the prevailing character of the surrounding area. However, only vacant parcels within existing commercial areas, so called "in-fill" sites, or contiguous sites may remain in commercial zoning.~~

- 5.2 Tourist Facilities - The County will support the development of tourist facilities where there is a showing there would be no conflict with agriculture and the necessity for this type of service can be documented to the County's satisfaction.

- Added
3/22/88 5.3 Lake Berryessa Area Commercial Recreational Zoning - Capell Valley, Berryessa Pines and Spanish Flat "Rural Residential" areas and the "Urban Residential" area between Pope and Putah Creeks are appropriate areas for commercial zoning and development.

5.4 Policies recognizing commercial uses in certain areas designated as Agricultural Watershed and Open Space and Agriculture Resource by the General Plan and permitting expansions thereof within the existing commercially zoned portion of such parcels.

Added 7-12-88

Amended 12-20-88

Amended 1-23-90

(a) In addition to those commercial facilities located in areas designated as urban on the Napa County Land Use Plan Map, there currently are a number of existing commercially zoned parcels, as well as a small number of non-commercially zoned parcels fronting upon the west side of the Napa River south of the city of Napa, which are designated as Agricultural Watershed and Open Space and Agriculture Resource on the Napa County Land Use Map. Commercial zoning and/or commercial use of most of these parcels pre-date the current General Plan and in many instances the original General Plan as well. Some of the existing commercial establishments provide important services to surrounding agricultural and open-space recreational areas. The purpose of this policy is to recognize in the Napa County General Plan the commercial nature of the commercially-zoned or commercially-used portions of such parcels, and to allow additional commercial development in these locations consistent with the commercial zoning of the commercially-zoned parcels or marine commercial nature of the existing uses on commercially-used portions of the non-commercially-zoned parcels discussed in this Policy. It is also the purpose of this policy to recognize that due to the small number of such parcels and the minimal impact such commercial operations and expansions will have, such limited development will not be detrimental to the Agriculture, Watershed or Open Space Policies of the General Plan and therefore such development is consistent with all of the goals and policies of the General Plan. It is not, however, the intent to allow commercial uses to expand beyond the boundary of the existing commercial zoning or existing marine-oriented commercial uses without first securing an appropriate General Plan Amendment.

(b) All existing commercial establishments qualifying under Policy 5.4(a) that are currently located within a commercial zoning district shall be allowed to continue to operate and use the existing buildings and/or facilities. Additional commercial uses which are permitted by the existing commercial zoning of the parcel shall be permitted on that portion of the parcel zoned commercial. Request that a non-conforming use be permitted to convert to a conforming use shall also be permitted on that portion of the parcel zone commercial.

5.5 Policies relating to land located within the RUL Line.

Added
7-12-88

Unincorporated commercial land located inside the Rural Urban Limit Line (RUL) of the Napa City General Plan will not be further urbanized without annexation to the City, except as provided in Rural Urban Lime Line Policy 7.1.

5.6 Marine Commercial Land Uses

Added
1-23-90

Lands along the west bank of the Napa River south of the City of Napa and specific urban areas within four miles of the high water mark of Lake Berryessa are appropriate areas for marine commercial zoning and development.

INDUSTRIAL POLICIES

- 6.1 Industrial Acreage - The County will plan for the reservation of sufficient industrial property to satisfy future demands for orderly growth and economic development of the County.
- 6.2 Industrial Development - The County will study the economic feasibility of enhancing the industrial potential of the Napa County Airport through means that are within Napa County's capability and desires. The precise type and extent of effort will be detailed in a specific plan for the area.
- 6.3 Industrial Location - The County will direct non-agriculturally oriented industry away from productive agricultural lands toward areas more suitable for industrial purposes as shown in Figure 14. The same location and design considerations applied to wineries will apply to all other food processing business or industrial uses located in the agricultural areas.
- 6.4 Jobs/Housing Balance - County review of industrial development proposals, particularly wineries, will address the balance of job creation and the availability of affordable housing.
- 6.5 Phased Development - In order to promote efficiencies of development the County will plan for staged development of water and sewer services. In order to remove some of the impetus for leapfrogging industrialization the County will develop plans and policies that would address needs peculiar to this area.
- 6.6 Pollution Hazard - The County will work with the Environmental Protection Agency, Bay Area Air Pollution Control District, Regional Water Quality Control Board, Division of Mines and Geology, and other environment-oriented public agencies to insure the maintenance of a high level of environmental quality and protection.
- 6.7 Services - The County will plan to locate industrial areas adjacent to major transportation facilities. Necessary utilities and services including day care centers will be planned to meet the needs of the industrially zoned areas.
- 6.8 Specific Plan - The County will place a priority on the preparation, review and approval of a Specific Plan and Master EIR for the development of the Napa County Airport Industrial Area.

7) RURAL URBAN LIMIT LINE (RUL) ISSUES

Added
7-12-88

In 1975, the City of Napa adopted the RUL Line which was intended, in part, to minimize development of property that is located within the RUL but is also in the unincorporated area. The County of Napa in 1975 included RUL policies within its General Plan and in 1984 the :UR (Urban Reserve) Zoning District was adopted to implement the General Plan Policies. The purpose of this section of the Land Use Element is to continue to promote the above policy of the City to the maximum extent possible.

RURAL URBAN LIMIT LINE (RUL) POLICIES

Added
7-12-88

7.1 Unincorporated land located within the Rural Urban Limit Line (RUL) of the Napa City's General Plan will not be further urbanized without annexation to the City except as otherwise provided herein. For purposes of this policy only, engaging in uses that are permitted in the applicable zoning district without the issuance of a use permit shall not be considered urbanizing. In all cases, subdividing property shall be deemed urbanizing for purposes of this policy.

Added
7-12-88

7.2 If the application of policy 7.1 operates to unreasonably restrict the manner in which a property owner may utilize his or her property, the property may be further urbanized without annexation to the City, notwithstanding Policy 7.1, if the following has occurred:

An application to annex one or more parcels has been filed with LAFCOM or the City and rejected by either entity within one year prior to the date of the application. Following annexation rejection by LAFCOM or the City, the property may be developed under Napa County jurisdiction, providing, however, in such a case the development standards imposed as a condition of the use permit shall be substantially the same as those required by the City of Napa for similar types of development. Subdivisions, if permitted, shall meet applicable County standards.

This exception shall not be applicable if the annexation application was filed and denied due to a lack of reasonable effort on the part of the property owner (hereafter "applicant") to complete the annexation, the applicant protests the annexation, or if the applicant fails to comply with any conditions of approval of the annexation. A lack of reasonable effort for purposes of this policy shall include, but not be limited to, the failure to include in an annexation request all contiguous parcels under the applicant's ownership that would reasonably be expected to be included in an annexation application.

7.3 Unless policy 7.2 or express language in the General Plan provides otherwise:

- (a) The development of unincorporated property located within the RUL in a manner that is authorized only if a use permit is obtained is prohibited. In such cases annexation to the City is required; and
- (b) The subdivision of unincorporated land located within the RUL is prohibited. In such cases annexation to the City is required prior to subdividing.

Added
7-12-88'

7.4 Property that would otherwise be subject to policy 7.2, but which is not contiguous to the City of Napa and therefore not annexable, may be developed in the County without first filing an annexation proceeding, provided that the applicant has notified the City not less than 60 days prior to the application being filed and the City has failed to initiate proceedings to annex sufficient parcels to enable the annexation of the applicant's parcel to be considered. If the City has initiated annexation proceedings during said 60 day period, the annexation provision of Section 7.2 shall continue to be applicable.

Added
7-12-88

7.5 Policies 7.2 through 7.4 shall not apply to parcels subject to a residential general plan or zoning designation.

Added
7-12-88

D. TRANSLATION OF GOALS AND POLICIES TO A LAND USE MAP

The Goals and Policies included in the Land Use Element comprise a set of development guidelines, which relationship is shown in Figure 12. The Development Determinants have been translated onto maps which are composited in Figure 13 and which show how the inherent characteristics of land affect its suitability for various land uses. The maps indicate, for example, which areas could be developed for urban use with the greatest economy, safety and environmental protection; which areas have the greatest potential for agricultural production; and which areas are best suited for open space uses. Some areas can be used for more than one purpose. The Development Determinant maps show where conflicts could be expected, and which areas have the greatest potential for a particular land use. The relationships previously described are important because the determinants indicate natural conditions over which people have little control, as well as man-made public facilities which would be costly to duplicate. Each of the Development Determinants has been ranked for its relative impact on various land uses. The following assumptions are implicit in the mapping process.

- a) Agricultural potential is dependent primarily on a combination of natural soil conditions, the effect of water availability and satisfactory climatic conditions.
- b) The slope of the land in the County is not likely to change.
- c) Erodible and irreplaceable soils, watershed needed for municipal water supplies, committed sewage disposal areas, sloughs and estuaries all require protection from urban encroachment in order to maintain the proper ecological balance.
- d) Wildlife habitat is critical for the maintenance of wildlife.
- e) Risks to life and property created by possible liquefaction or subsidence, critical fire conditions, landslides, faults and flood plains are to be avoided or minimized.
- f) Air pollution is likely to be a continuing and growing problem in Napa County's valleys.
- g) Public water and sewer systems, fire protection and health services should be used efficiently.
- h) Public health, safety and welfare are best served by concentrating people where reliable public services are available.

The Development Determinants Composite Map (Figure 13) contains considerations crucial to the development of the Napa County Land Use Plan (Map) 1983-2000 (Figure 14).

FIGURE 12: POLICIES-DEVELOPMENT DETERMINANTS RELATIONSHIP

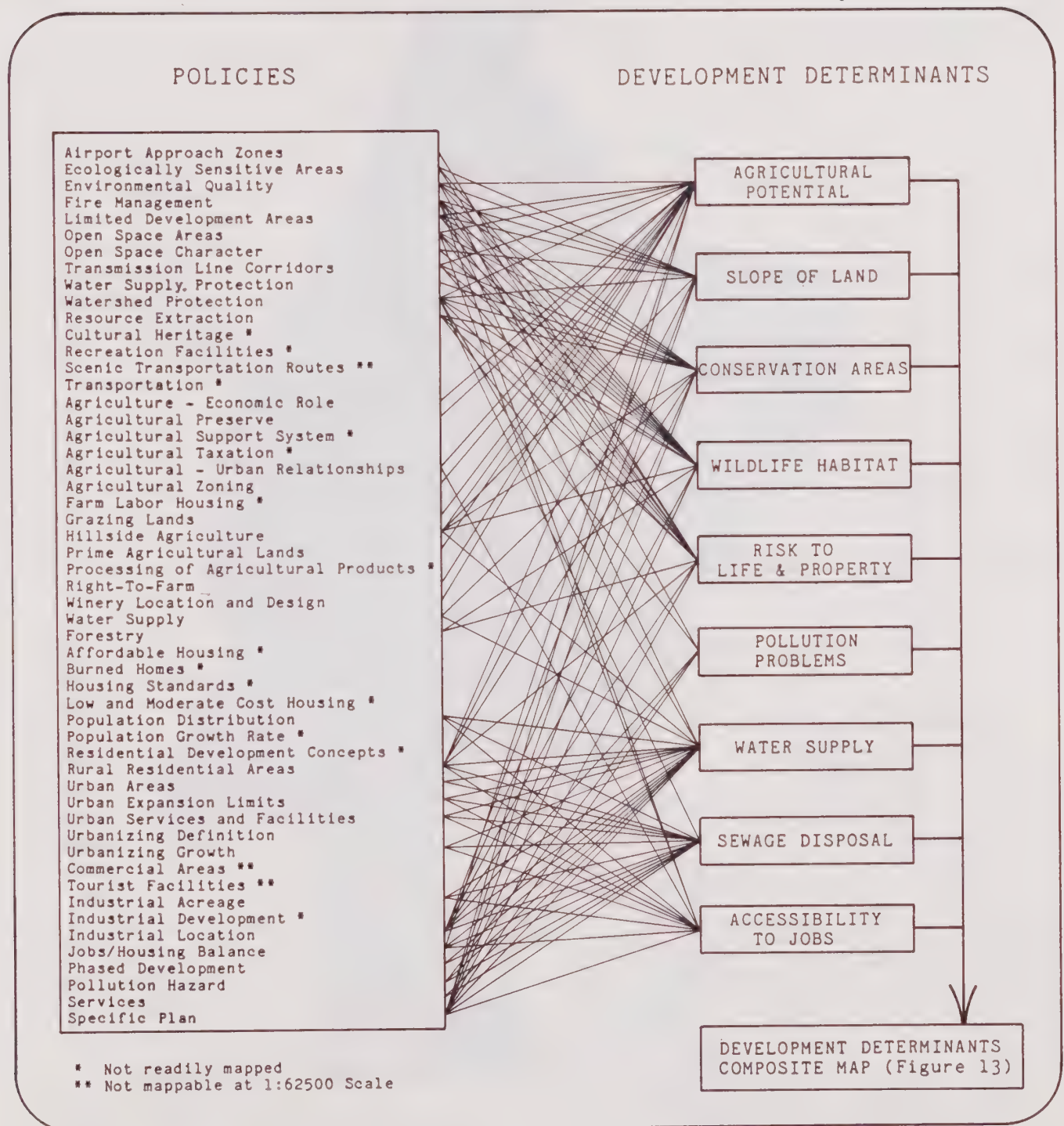
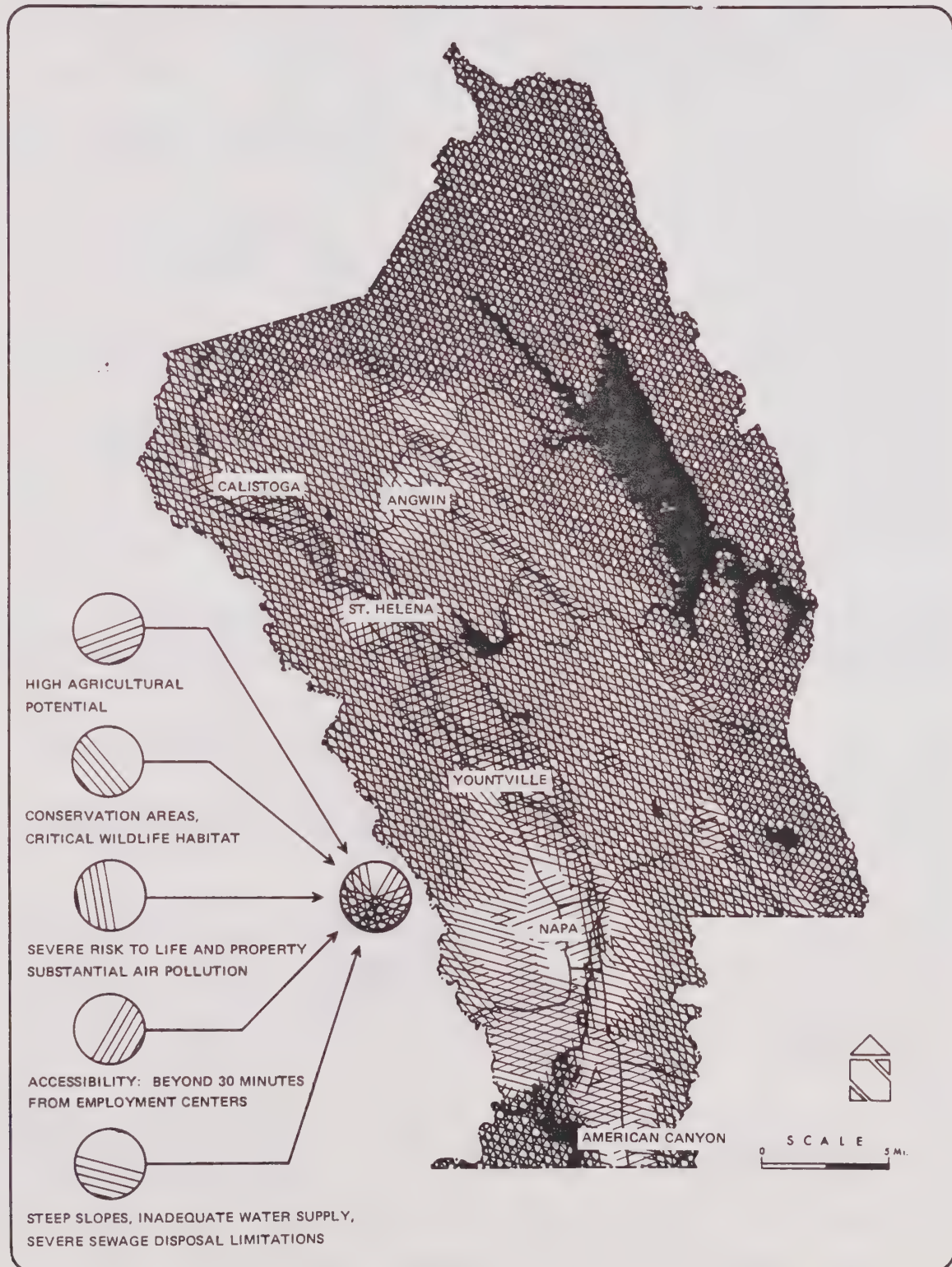


FIGURE 13: DEVELOPMENT DETERMINANTS COMPOSITE MAP (GENERALIZED)



6/7/83

The Land Use Map Provides a Generalized Picture of the Goals and Policies Contained in the Land Use Element Report Using Eight Broad Land Use Classifications and Eight Symbols. The Map Presents a Graphic Overview of the General Distribution and Location of Major Land Use Areas and Facilities.

including this Map was amended by the
Napa County Board of Supervisors by Resolution No.
88-105 on July 11, 1989

SA-105 on July 11, 1969
Bob White Bob White, Chairman

Agnes Del Zompo Agnes Del Zompo, Clerk of the Board

Amended by the Napa County Conservation,
Development and Planning Commission by
Resolution No. 89-7 on June 21, 1989

Attest: Jeffrey Redding Daniel Jones, Chairman
Jeffrey Redding, Secretary











- | | |
|---|----------------------|
|  | CITIES |
|  | URBAN RESIDENTIAL |
|  | RURAL RESIDENTIAL |
|  | COMMERCIAL |
|  | INDUSTRIAL |
|  | PUBLIC-INSTITUTIONAL |

OPEN SPACE

- AGRICULTURE, WATERSHED & OPEN SPACE
 AGRICULTURAL RESOURCE

TRANSPORTATION

- | | |
|---|------------------------|
|  | LIMITED ACCESS HIGHWAY |
|  | MAJOR ROAD |
|  | SECONDARY ROAD |
|  | RAILROAD |
|  | AIRPORT |
|  | LANDFILL |
|  | AIRPORT CLEAR ZONE |
|  | MINERAL RESOURCE |

[illegible]

BOARD OF SUPERVISORS

SCALE 194-2011-09

10



NAPA COUNTY LAND USE PLAN 1989-2000

E. NAPA COUNTY LAND USE PLAN (MAP) 1986-2000

The Napa County Land Use Plan (Map) 1986-2000 reflects the planning Goals and Policies mapped on the Development Determinants Composite Map. Figure 14 is a photographic reproduction of the Napa County Land Use Plan (Map) 1986-2000 (scale 1 inch = 2 miles) included as part of this Element. (See insert map.) The map indicates the general location of major land use areas of the County in the year 2000.

F. STANDARDS

*Amended
12-20-88* The following standards apply to the General Plan Land Use Element land use classifications shown in the Napa County Land Use Plan (Map) 1986-2000. The minimum parcels sizes shall be as indicated below, unless text existing in the General Plan expressly authorizes different lot size.

1) Cities (not under County jurisdiction; consult City general plans).

2) Urban Residential

a) Intent

Provide, in identified urban areas, for development of a full range of urban housing opportunities, such as single family dwellings, multiple dwellings, townhouses, row houses, condominiums, and cluster housing in a desirable relationship to planned common use space, limited commercial, institutional, educational, day care, cultural, recreational and other uses, while at the same time preserving the quality of urban areas.

b) General Uses

*Amended
3-22-88*

Single family dwellings, multiple dwellings, mobilehome parks, day care centers, limited commercial (denser uses subject to specified conditions).

c) Minimum Parcel Size

Between 0.0625 acre and 1 acre.

d) Maximum Dwelling Density

One dwelling per parcel (except as specified in Housing Element). Other residential, commercial, educational and recreational facilities subject to specified conditions related to the adequacy of utilities and normal municipal services.

3) Rural Residential

a) Intent

Amended
3-22-88

Amended
23-90

Land in proximity to existing urban areas but currently in agriculture or developed with low density year-round residences in neighborhoods in which further parcelization will be discouraged. Other land near major public recreational areas which, because of its location in relation to existing or future 1-community services, facilities, and access roads, and because underlying soil and geological characteristics, land slope and minimum fire hazard is suitable for low density single family residential development, tourist-serving commercial development and resident-serving commercial development.

b) General Uses

Amended
7-12-88

Single family dwelling, day care center, **private school**, agriculture, stables (and others under specified conditions). In Capell Valley and Berryessa Areas tourist-serving commercial uses will also be allowed.

c) Rural Residential

Amended
1-23-90

Minimum Parcel Size: 10 acres, except that permitted commercial development may be allowed on parcels no smaller than 5,000 sq. ft. to 1 acre, depending on the type of facility and availability of water and sewer service.

d) Maximum Dwelling Density

One dwelling per parcel (except as specified in Housing Element).

4) Commercial

a) Intent

(1) Provide areas where residents of the unincorporated area of the County may obtain commercial services for day-to-day needs in surrounding land uses. The area and location of such districts shall be determined largely by the urban nature and extent of the local trade area to be served. Other criteria which will figure significantly in the choice of parcels deemed suitable for classification include availability of public service, public utilities, traffic safety, character of the site and surrounding area. The central business district of each incorporated city shall be recognized as the dominant commercial and financial center for the surrounding unincorporated area of the county.

d) Maximum Dwelling Density

One dwelling per parcel (except as specified in Housing Element). Other residential, commercial, educational and recreational facilities subject to specified conditions related to the adequacy of utilities and normal municipal services.

3) Rural Residential

a) Intent

Amended
3-22-88
1-23-90
6-19-90

Land in proximity to existing urban areas but currently in agriculture or developed with low density ear-round residences in neighborhoods in which further parcelization will be discouraged. **On some lands suitable for increased population density near major medical care facilities, large residential care homes may be permitted.** Other land near major public recreational areas which, because of its location in relation to existing or future community services, facilities, and access roads, and because underlying soil and geological characteristics, land slope and minimum fire hazard is suitable for low density single family residential development, tourist-serving commercial development and resident-serving commercial development.

b) General Uses

Amended
7-12-88
6-19-90

Single family dwelling, day care center, **large residential care homes, private school, agriculture, stables (and others under specified conditions).** In Capell Valley and Berryessa Areas tourist-serving commercial uses will also be allowed.

c) Minimum Parcel Size

Amended
1-23-90

10 acres, except that permitted commercial development may be allowed on parcels no smaller than 5,000 sq. ft. to 1 acre, depending on the type of facility and availability of water and sewer service.

d) Maximum Dwelling Density

One dwelling per parcel (except as specified in Housing Element).

4) Commercial

a) Intent

(1) Provide areas where residents of the unincorporated area of the County may obtain commercial services for day-to-day needs in surrounding land uses. The area and location of such districts shall be determined largely by the urban nature and extent of the local trade area to be served. Other criteria which will figure significantly in the choice of parcels deemed suitable for classification include availability of public service, public utilities, traffic safety, character of the site and surrounding area. The central business district of each incorporated city shall be recognized as the dominant commercial and financial center for the surrounding unincorporated area of the county.

- (2) Provide areas consistent with the General Plan in which the principal use of land is devoted to general commercial uses in non-marine urban areas, limited commercial facilities essential to the needs of residents in residential neighborhood areas, limited commercial facilities oriented to the needs of recreational users in marine area, and limited commercial facilities serving the needs of travelers in locations in proximity to primary transportation corridors which provide access to areas where tourist-oriented uses predominate.

b) General Uses

Neighborhood, tourist and other limited commercial uses; subject to specified conditions.

c) Minimum Parcel Size

1 acre; ½ acre where public water and sewer are available.

d) Maximum Building Density
50% coverage.

5) Industrial

a) Intent

To provide an environment exclusively for and conducive to the development and protection of a variety of industrial uses such as administrative facilities, research institutions, limited commercial and related facilities which are ancillary to the primary industrial uses and specialized manufacturing organizations to be located in area suitable for industrial development.

b) General Uses

Industry, limited commercial and related facilities which are ancillary to the primary industrial uses, agriculture, wineries, no residential uses.

c) Minimum Parcel Size

½ acre to 40 acres depending on proximity and access to utilities, airport, highways, rail service and service roads (subject to modifications to be contained in the Napa County Airport Industrial Area Specific Plan).

d) Maximum Building Density
50% coverage.

6) Public-Institutional

a) Intent

To indicate those lands set aside for a public purpose which does not fit into any other category, such as for hospital, sanitation district, and airport uses.

b) Minimum Parcel Size and Maximum Building Intensity

Not applicable

7) Agriculture, Watershed and Open Space

a) Intent

To provide areas where the predominant use is agriculturally oriented; where watershed areas, reservoirs, floodplain tributaries, geologic hazards, soil conditions and other constraints make the land relatively unsuitable for urban development; where urban development would adversely impact on all such uses; and where the protection of agriculture, watersheds, and floodplain tributaries from fire, pollution, and erosion is essential to the general health, safety, and welfare.

b) General Uses

Agriculture, processing of agricultural products, single family dwelling.

c) Minimum Parcel Size

40 acres to 160 acres, depending upon physical constraints.

d) Maximum Building Intensity

One dwelling per parcel (except as specified in Housing Element). Non-residential building intensity is non-applicable.

8) Agricultural Resource

a) Intent

To identify areas in the fertile valley and foothill areas of the County in which agriculture is and should continue to be the predominate land use, where uses incompatible with agriculture should be precluded and where the development or urban type uses would be detrimental to the continuance of agriculture and the maintenance of open space which are economic and aesthetic attributes and assets of the County of Napa.

b) General Uses

Agriculture, processing of agricultural products, single family dwelling.

c) Minimum Parcel Size

40 acres.

d) Maximum Building Intensity

One dwelling per parcel (except as specified in Housing Element). Non-residential building intensity is non-applicable; but where practical, buildings will be located off prime soils.

HOUSING



GENERAL PLAN

HOUSING ELEMENT

TABLE OF CONTENTS

	Page
1. Introduction.....	40
1A. Review and Revision.....	42
2. Goals.....	53
3. Policies, Objectives and Programs.....	56
4. Implementation Methods.....	73
5. Analysis of Housing Problems and Needs.....	79
6. Appendix.....	132

FIGURES

14A. 1985-1989 Housing Units Added.....	44
14B. New Construction in American Canyon 1985 - 1990.....	45
14C. Summary of Prior Housing Element Results.....	46
15. Five Year Housing Objectives (1990 - 1995).....	63
17. Summary of Housing Element Housing Program Actions.....	69
18. Population, Napa County, 1980-1990.....	80
19. Age and Sex of Population, 1980.....	81
20. Minority Population, Napa County, 1980.....	82
21. Napa County Household Characteristics, 1980.....	83
22. Household Incomes Unincorporated Area, 1979.....	84
23. Dwelling Units by Type of Structure, Napa County, 1980.....	85
24. Napa County Dwelling Units by Tenure, 1970 and 1980.....	86
24A. Unincorporated Napa County Dwelling Units by Tenure, 1980.....	87
25. Napa County Unincorporated Housing Need, 1988-1995 (inclusive).....	88
25A. Job/Household Ratio, Bay Area 1980 and 1990.....	89
26. Forecast Employment by Industry and Occupation, Napa County 1990, 1995.....	90
27. Wage and Salary Employment, Napa County, 1985-1987.....	90
27A. Total Employment, Napa County, 1980-1995.....	91
28. Year Structure Built, Napa County Unincorporated Area.....	92
29. Housing Conditions, Unincorporated Area, 1989.....	93
30. Typical Obsolescence of Wood Frame Single-Family Dwelling.....	94
31. Cost of Standard Quality Single Family Residence San Francisco Bay Area, January, 1986.....	96
32. Average Cost of New Housing (Not Including Land Costs) Based Upon Building Permits, City of Napa, County of Napa, 1966-1985.....	99
33. Hourly Construction Wages, 1982-1986.....	101
34. Cost of Construction Materials, 1970-1984.....	101

	Page
35. Monthly Mortgage Payments (Principal and Interest), 30 Year Amortization.....	102
36. Household Income Limits, 1990.....	104
37. Owner-Occupied Units by Household Income, 1979.....	106
38. Renter-Occupied Units by Household Income, 1979.....	107
39. Overcrowding, Lacking Central Heating, Incomplete Kitchen Facilities, Unincorporated Napa County, 1980.....	108
40. Inadequate Living Conditions, Owner-Occupied Units, Napa County, 1970.....	109
41. Inadequate Living Conditions, Renter-Occupied Units, Napa County, 1980.....	110
42. Special Housing Needs, Unincorporated Napa County, 1980.....	112
42A. Dwelling Units by Number of Bedrooms, 1980.....	113
43. Approved Residential Developments, American Canyon.....	116
44. Residential Development Expected in American Canyon by 1990.....	117
45. Existing Zoning in American Canyon, 1986.....	118
45A. Potential Residential Sites in Portion of American Canyon, Based on Existing Zoning, 1986.....	119
46. Water Supply Availability in American Canyon.....	121
47. Local Shares of Regional Housing Needs, Dwelling Units Per Year - 1988 through 1995.....	122
48. Dwelling Unit Forecast, Unincorporated Area, 1986-1990.....	125
49. Annual New Construction Need by Income Groups.....	126
50. Schedule of Zoning District Regulation, Napa County Code.....	128
51. New Planning Fees, July 11, 1989.....	129

1. INTRODUCTION

PURPOSE

The purpose of this Housing Element is to provide:

- an identification and analysis of existing and projected housing needs of all economic segment of the county.
- a statement of goals, policies, quantified objectives and scheduled programs for the preservation, improvement and development of housing.
- an identification of adequate sites for housing.

AUTHORITY

Housing elements are required as a mandatory element of General Plans by Sec. 65302(c) of the Government Code. In 1980, the State Legislature passed a bill (AB2853) which put into statute much of the former advisory guidelines regarding housing element content including: the needs assessment; goals, objectives and policies; and implementation program. Appendix E contains greater detail on this subject.

STATUS

This document is an amendment to the Housing Element of Napa County's General Plan most recently amended by the Board of Supervisors on December 20, 1988. The Housing Element is consistent with the voter-approved "Slow Growth Initiative Measure A" and the Growth Management System Element of the Napa County General Plan. The Housing Element focuses on housing needs through 1995.

State law requires that:

"Each local government shall review its housing element as frequently as appropriate to evaluate all of the following:

- (1) The appropriateness of the housing goals, objectives and policies in contributing to the attainment of the state housing goal.
- (2) The effectiveness of the housing element in attainment of the community's goals and objectives.
- (3) The progress of the County in implementation of the housing element.

The housing element shall be revised as appropriate but not less than every five years, to reflect the results of this periodic review.

CONSISTENCY WITH GENERAL PLAN

State Law requires that a general plan and elements "comprise an integrated, internally consistent and compatible statement of policies." This implies that all elements have equal legal status and no one element is subordinate to any other element.

The housing element must be consistent with population projections and land use goals and policies set forth in the land use element and closely coordinated with the circulation element of the General Plan.

FORMAT

In addition to this introductory chapter, the Housing Element is divided into four additional chapters and an appendix. Chapters 2 and 3 set forth the goals, objectives, policies and programs for Napa County's Housing Action Program. Chapter 4 presents more detailed information on implementation methods. Chapter 5 contains data demonstrating the County's housing needs and problems.

STATEMENT OF INTENT

By this Housing Element Napa County acknowledges there are housing problems and needs in the unincorporated areas of Napa County. The County further acknowledges that these needs are part of countywide, regional, state and national housing problems. Napa County recognizes its responsibilities under Measure A and State Housing laws to address its housing needs independently and in concert with other local, regional, state and national private and public sector organizations.

Given this framework for Napa County's housing needs, it is the intent of this Element to set forth a five year housing program that maximizes the limited opportunities for new housing construction in the unincorporated areas of the County while developing the capacity for assisting in the affordability, maintenance and rehabilitation of the existing housing stock. Priority in both new construction and rehabilitation will be provided to low and moderate income households, particularly the elderly, minorities, homeless and farmworkers.

It should be clearly understood by the public and governmental agencies (local, regional, state and federal) that the unique circumstances of the implementation of Slow Growth Initiative Measure A, notably including the "grandfathered" units entitled to be built prior to 1990 provide a one-time opportunity for a level of new housing construction that will not be possible in the unincorporated area after 1990. Consequently, the emphasis for the unincorporated County's housing programs will shift after 1990 from a higher degree of new construction to a higher degree of rehabilitation and affordability of the existing housing stock and county-cities cooperation directed towards locating urban uses in urban areas.

1.A. REVIEW AND REVISION

State law requires the County to review the previous element to evaluate its appropriateness, effectiveness, and progress in implementation, and reflect the results of this review in the revised element (Sections 65588 (a) and (b)). There are three parts to the information which should be provided:

- a. "Effectiveness of the element" (Section 65588(a)(2)): a comparison of the actual result of the earlier element with its goals, objectives, policies, and programs. The results should be quantified where possible (e.g., rehabilitation results), but may be qualitative where necessary (e.g., mitigation of governmental constraints).
- b. "Progress in implementation" (Section 65583(a)(3)): an analysis of the significant differences between what was projected or planned in the earlier element and what was achieved.
- c. "Appropriateness of goals, objectives and policies" (Section 65588(a)(1)): a description of how the goals, objectives, policies, and programs of the updated element incorporate what has been learned from the results of the prior element.

1. Effectiveness of the Element

a. Rehabilitation

The County has continued to periodically update the Building Code and Housing Code. Both were updated in 1989 by adoption of the 1988 Uniform Building & Housing Code.

The County inspects existing housing on a complain or referral basis.

Some progress has been taken to initiate a rehabilitation program. The Affordable Housing Task Force recommended in March 1986, that HAND expand to the unincorporated area. A weatherization program for low income property owners has been initiated in the unincorporated areas, but no other administrative and loan funding has not as yet been granted.

b. Affordability

To meet some of the affordability needs the Napa Valley Housing Authority provides low income rental assistance through the Section 8 Housing Subsidy Program and Moderate Rehabilitation Program to eligible persons residing in the unincorporated area of Napa County.

As a result, the Napa Valley Housing Authority's March 31, 1990 report indicates

the current distribution of Section 8 certificates and vouchers total 787, 15 to low income persons residing in the County unincorporated area residing outside the City of Napa. In addition, the Authority has set aside 25 certificates for AFDC households approved by the County welfare department.

In terms of new construction of affordable housing, 35 mobile home units in American Canyon received building permits. Sales prices were in the \$35,000 to \$69,000 range*. Furthermore, 78 second units were issued building permits during the period 1985-1989. The Canyon Creek Phase II development in American Canyon entered an agreement to restrict 33 lots for affordable housing.

The County Board of Supervisors established an Affordable Housing Task Force in 1985 which issued a report in early 1986 that included recommendations for rehabilitation, low cost new construction and housing planning and information (see Appendix D.)

c. Special Needs

In the 1980-1985 period the County took several steps to meet some of the needs of the County's special housing needs. The County allocated \$50,000 of revenue sharing funds for one-half the cost of the purchase of a residence for the Napa Emergency Women's Shelter (NEWS) program. In addition, the County provided \$10,000 of revenue sharing funds for a NEWS paralegal. Also, NEWS receives a percentage of County marriage license fees, about \$12,000 annually. During 1989, 79 women and children were provided shelter. The facility can accommodate 6 persons.

The Samaritan House and the Sullivan Building are facilities for persons needing temporary or emergency housing shelter. The Sullivan Building, located in a County-owned building for a \$1 per year rent, was opened in December 1987 to provide shelter for up to 40 persons, single men and women. The Samaritan House provides shelter for homeless family members. The Napa County Council for Economic Opportunity (NCCEO) was one of the original groups that started the Samaritan House in 1983, and the 1989 began management of both facilities.

The County provided \$17,000 annual budget to maintain the Napa County Rental Information and Mediation Service (NCRIMS) during the period 1985-1989, and has included this program in the current budget. As part of mediating tenant-landlord relations, NCRIMS also handles fair housing complaints.

*plus land lease payments of \$222 to \$395 per month.

The County adopted a second unit (or "granny" unit) ordinance in 1984, which allows attached or detached unit (subject to certain conditions/requirements) in any residential district or the Agricultural Watershed District. This has resulted in the construction of some 78 second units during the period 1985 through 1989.

Year-round farm worker housing has continued to be a difficult housing problem. The Napa County Combined Planning Commissions, an informal, intergovernmental body, studied the problem in the early 1980's as did the County's Affordable Housing Task Force in 1985. In that the private sector agriculturalists, farm workers, County officials and State funding sources must all work together, a high degree of cooperation and leadership is needed to achieve results.

d. Five Year Housing Development

Over the past five year period from 1985 through 1989 the County issued permits for an unincorporated total of 1,542 residential units, 1,538 single family and 4 multiple family units in Angwin. There were some 87 units demolished, resulting in a net increase of 1455 units an average of 291 units per year. The ABAG projected minimum regional need was 1,357 units. Using the gross number of units built, 1542, the minimum regional need was exceeded by 185 units.

A breakdown of units built by estimated income group is shown in Figure 14A below:

FIGURE 14A: 1985-1989 Housing Units Added

		REGIONAL NEED	ACTUAL
Above Moderate	(39%)	529	1,238
Moderate	(21%)	285	226*
Low	(17%)	231	78**
Very Low	(23%)	312	0
		1,357	1,542

*Mobile Homes

**Second Units

Source: ABAG; Napa County Building Department

e. Housing Location, Density and Timing

Most objectives were met by adoption of the 1984 General Plan, the completion of General Plan consistency rezonings, amendment of the PD zoning ordinance, approval or reaffirmation of development plans for 1,093 units in the American Canyon area served by public sewer and water of the 1093 grandfathered units in American Canyon 225 remain to be constructed. Actual construction, however, is shown in Figure 14B.

FIGURE 14B: NEW CONSTRUCTION IN AMERICAN CANYON, 1985-1989

	Owner Occupied		Renter Occupied
	Single Family Detached	Mobile Home	
Above Moderate	629	--	--
Moderate Income	--	198	--
Low Income	--	--	--
Very Low Income	--	--	--
Total	629	198	0

f. Urban Facilities and Services

The County continued to implement its policies for urban services in areas planned for urban development.

g. Governmental Constraints

The County achieved some success in removing government constraints by revising its PD ordinance and by use of development agreements which provide for higher densities and modified development standards.

h. Energy Conservation

The County continued its policy of urban development in urban areas to help reduce energy costs.

FIGURE 14C: SUMMARY OF PRIOR HOUSING ELEMENT RESULTS

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE/ RESULT
REHABILITATION						
1.1	Housing Code	Adopt most recent housing	Review, amend and adopt	Normal County budget	Building Division, CDPD	Every 3 years
1.2	Housing Surveillance	Inspect existing housing units	Voluntary inspection program	Federal (CDBG)	BOS contract with HAND	Ongoing
1.3	Rehabilitation	Rehabilitate 50 units	Voluntary rehabilitation program	Federal (CDBG) FMHA 502/504	BOS contract with HAND	Not Implemented
1.4	Coordinate Rehabilitation	None	Establish ongoing inter-governmental	Normal County budget	NVHA/CDPD	4/87
AFFORDABILITY						
2.1	Use Federal Assistance Programs for renter of existing units	Assist 100 low/very low income rental households*	Rental subsidy	Federal Sec. 8	NVHA	Ongoing
2.2	New affordable units in American Canyon	Construct 376 affordable units	Below market interest mortgage money	Tax Exempt Mortgage Revenue bond (TEMRB)	BOS/NVHA	9/1/87
2.3	Variety of least cost housing	Factory-built; mobile homes; innovative design; second units	Density bonus; development agreement; reduce fees	Normal County budget; TEMRB	CDPD/NVHA	Ongoing
2.4	Coordinate affordable housing		Establish on-going inter-governmental advisory group	Normal County budget	NVHA,BOS	4/87
*during remaining portion of <u>five</u> year period 1986-1990.						

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE/ RESULT
2.5	Local fair-share of low and moderate-income housing		Establish on-going inter-governmental advisory group	Normal County budget	NVHA, BOS	4/87
2.6	Encourage second units		Implement Ordinance	Normal County budget	CDPC	Ongoing
2.7	<u>Develop & Implement Density Bonus & Small Lot Development Program</u>	<u>Encourage long-term housing units affordable to low & moderate income housing</u>	<u>Implement Ordinance</u>	<u>Normal County Budget</u>	<u>CDPC/BOS</u>	delayed
SPECIAL NEEDS						
3.1	Reinforce Fair Housing laws		Referral to enforcement agency	Normal County budget/State and Federal funds	NVHA /District Attorney's office/NCRIMS	Ongoing
3.2	Priority to Special Needs	Assist 250 households	Various	State HCD; FmHA; HUD CDBG; Second Units	NVHA, BOS	Ongoing
3.3	Migrant farm labor housing inspection	Inspect existing housing units	Continue existing program	Normal County budget	Environmental Health Division, Dept. of Health	Ongoing
3.4	Support emergency housing programs	As need arises		HUD CDBG	NHA, BOS	Ongoing
3.5	Encourage second units		Implement ordinance	Normal County budget	CDPC	Ongoing
FIVE YEAR HOUSING DEVELOPMENT						
4.1	Coordinate housing goals		Establish on-going inter-governmental coordination	Normal County budget	NVHA, BOS	1/1/87
4.2	Preference to incorporated/ urban areas	Issue permits for up to 1,833 new housing units	Planning Process	Normal County budget	CDPD	Ongoing 1542 issued

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE/ RESULT
4.3	Agriculture is primary land use		Planning Process	Normal County budget	CDPD	Ongoing
4.4	Primary single family housing		Planning Process	Napa County budget	CDPD	Ongoing
4.5	Comply with Measure A/ Housing Need Report	1,833 new units between 1985 and 1990	Planning Process	Napa County budget	CDPD	Ongoing
HOUSING LOCATION, DENSITY AND TIMING						
5.1	Urban density regulations		General Plan/ zoning conformance	General County budget	CDPD	6/1/87
5.2	American Canyon public services	988 units during period 1985 to 1990	Zoning	General County budget	CDPD/PWD	Ongoing
5.3	Residential County areas		Inter-governmental coordination/ specific plans	General County budget	CDPD	Ongoing
5.4	Capell/ Berryessa rural residential develop-ment		Local planning process	General County budget	CDPD	Ongoing
5.5	Development Concepts		Local planning process	General County budget	CDPD	Ongoing
5.6	Define urban reserve areas		Local planning process	General County budget	CDPD/LAFCO	7/12/88
URBAN FACILITIES & SERVICES						
6.1/ 6.2/ 6.3/ 6.4	Annex for urban services		Develop/ improve urban area services	General County budget	CDPD/PWD	Ongoing approx. 694 acres annexed
6.5	Angwin area urban services		Develop urban services	General County budget	CDPD/PWD	Ongoing
GOVERNMENT CONSTRAINTS						

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE/ RESULT
7.1	Reduce fees for low/moderate income housing	Reduce cost of housing to consumer	Establish criteria/process to reduce/waive fees	General County budget	CDPD	Delayed
7.2	Modify application/processing procedure for low/moderate income housing	Reduce cost of housing to consumer	Implement citizen's committee report	General County budget	CDPD	Ongoing
7.3	Modify standards for low/moderate income housing	Reduce cost of housing to consumer	Establish criteria/process to sue new standards	General County budget	CDPD/PWD	Not Implemented
7.4	Benefits for low/moderate income housing	Reduce cost of housing to consumer	Establish methods to insure benefits	General County budget	CDPD/PWD	Not Implemented
ENERGY CONSERVATION						
8.1	Use of existing urban areas	Reduce energy costs	Local planning process	General County budget	CDPD	Ongoing
8.2	Modify site development standards	Reduce energy costs	Local planning process	General County budget	CDPD/PWD	Delayed
8.3	Encourage retrofitting of existing housing	Reduce energy costs	Local building code process Weatherization Program	General County budget CDBG funds	BOS/NVHA/ HAND	Ongoing
KEY: CDPD - Conservation Development & Planning Department CDBG - Community Development Block Grant HAND - Housing Association for Napa Development PWD - Public Works Department NVHA - Napa Valley Housing Authority BOS - Board of Supervisors LAFCOM - Local Agency <u>F</u> ormation Commission						

2. Progress in Implementation

a. Rehabilitation

Existing housing rehabilitation efforts were continued. Through HAND (Housing Association for Napa Development), during the period 1/85 to 3/90, 217 homes in the unincorporated area were assisted to make their homes more energy efficient through the Weatherization Program.

The County initiated a County-wide housing condition survey, completed in October, 1989. The County competed for and received State Community Development Block Grant Funds which are to be utilized for rehabilitation of 26 units in the American Canyon target area.

b. Affordability

Significant progress was made. The Napa Valley Housing Authority was established in 1987 as a Joint Powers Authority among Napa, Calistoga, St. Helena, Yountville, and the County. The NVHA serves the very low income population with the Section 8 Housing subsidy program certificates/vouchers.

The County added a goal to development and implement a density bonus and small lot development program. This program will be implemented in late 1990. The developer of Canyon Creek Mobilehome Park entered an Agreement with the County on March 9, 1990, to restrict 33 units of Phase II of their subdivision to affordable housing for a five year period as a condition of approval of the subdivision. The established price as of April 20, 1988 was \$91,000, and can increase in the future in relation to the San Francisco Bay Area Consumer Price Index.

The allotment of "Affordable" residential building permits, Category #4 under the Napa County General Plan Growth Management System, has been accumulated to a total of sixty (60).

c. Special Needs

Significant progress was made. A second homeless shelter facility, the Sullivan Building, was established in 1987. The County-owned structure provided to the operator at an annual cost of \$1.00 provides temporary shelter to single persons, male and female, and to families. The forty (40) bed facility provided 10,390 shelter days (number of persons per night) in 1988, and 11528 shelter days in 1989. During the period between 1985 and 1990, the seven (7) bed Samaritan facility provided 6,012 shelter days. (See appendix for additional information.)

Both facilities are managed by NCCEO (Napa County Council for Economic Opportunity) utilizing Federal and State funds, City funds and donations.

d. Five-Year Housing Development

A significant number of the "grandfathered" single family units and second units were built, and mobile homes installed in the American Canyon area. Between 1985 and 1990, 1658 dwelling units were built/installed with 87 dwelling demolished throughout the unincorporated areas of the County.

e. Housing Location, Density and Timing

Development in the American Canyon area increased considerably, with the issuance of 868 building permits in the "grandfathered" single family and mobile home developments.

The development of a bonus density and small lot development program was postponed and will be implemented late in 1990.

f. Urban facilities and Services

The cities have annexed where urban developments have been proposed. The County has discouraged developments which require urban services and which are not planned for urbanization.

During the period 1985-1990, approximately 694.72 acres were annexed to incorporated cities.

g. Governmental Constraints

Some constraints such as land use densities and development standards were reduced by revised ordinances.

h. Energy Conservation

The County incorporated the use of State-mandated energy standards in new construction. A "Weatherization" program, administered by HAND, utilizes State funds and with P G & E programs to rehabilitate homes to a more energy efficient level. 217 homeowners have taken advantage of this program during the period 1985-1990.

3. Appropriateness of Goals, Objectives and Policies

The goals were not modified except to include the homeless as a special need group.

The policies, objectives and programs were adjusted to generally extend the level of objectives in the areas of affordability, special needs and five year housing development to reflect progress during the last five years. Progress in these three areas was significant and the more realistic set of objectives and programs were determined to be effective.

In the areas of rehabilitation, the County took a more active approach to seeking available State and Federal Community Development Block Grant funds. In the area of governmental constraints where little change was made during 1981, a more realistic set of objectives and programs was determined, and implementation will be initiated late 1990.

In the areas of urban facilities and services, housing location, density and timing and energy conservation, where general progress was made and will continue at the same general level, no changes were reflected in the 1986-1990 policies, objectives and programs.

1.B. Public Participation

The proposed 1990 Draft Update Revision of the Napa County Housing Element was made known to local private and public agencies with an interest in housing development.

In addition, notices of the public hearings before the Board of Supervisors and Planning Commission were placed in local newspapers.

2. GOALS

1. STATE OF CALIFORNIA

The State of California has found "the subject of housing to be of vital statewide importance and had declared the early attainment of a decent house and a satisfying environment for every Californian to be a priority of the highest order".

2. ASSOCIATION OF BAY AREA GOVERNMENTS

ABAG has suggested three regionwide housing objective:

- a. To increase the housing supply in accord with the Region's needs.
- b. To maintain and improve existing housing so that it can better fill the Region's needs.
- c. To expand and conserve housing opportunities for lower income people.

3. NAPA COUNTY

The Housing Element of the Napa County General Plan includes the consideration of the housing needs of all economic segments of the population residing in the unincorporated areas of the County. Napa County recognizes the entire County as a housing market area and desires to cooperate with the cities and districts of the County in meeting housing needs.

The following goals express Napa County's concern in regard to local housing problems and needs:

GOAL 1: Assure that the goals, implementation measure and specific housing programs are compatible with other elements of the General Plan and are pursued in a timely fashion. In particular the County's Housing Program should be compatible with the County's policies (including Measure A Growth Management System) to plan for agriculture and related activities as the primary land uses in the County and to concentrate urban uses in the County's existing cities and urban areas.

GOAL 2: Assure that the quality, safety and livability of the housing stock in the County of Napa is continually maintained or upgraded through rehabilitation and that care be taken to minimize the number of units lost by removal (through deterioration or conversion to commercial use).

- GOAL 3:** Assure that the quality, safety and livability of designated residential areas of the County of Napa is continually maintained or improved such that the essential services and facilities are available.
- GOAL 4:** Encourage housing programs and policies that maximize choice and economic integration and eliminate discrimination based on age, sex, race, color, ethnic background, marital status, religion, disability or any other arbitrary factors.
- GOAL 5:** Assure that lower and middle income housing located in the unincorporated areas of the County is maintained and developed in a way that is responsive to the following considerations:
- Increases the level of home ownership of low and middle income families.
 - Increases the availability of units for the elderly, farmworkers, homeless and the disabled.
 - Minimizes the need for private transportation for shopping facilities, schools, recreation and employment.
 - Reduces the cost of housing in regard to construction, sale and rental of dwelling units.
 - Protects monthly rental (residential) units from conversion to daily/weekly (commercial) use.
- GOAL 6:** Encourage coordination between private and public parties involved in the regulation, development, production, management, financing and sales and rental of the housing stock in the County of Napa.
- GOAL 7:** Work with the cities, other governmental units, citizens, and the private sector to plan for services, facilities and accommodations, including housing, transportation, economic development, parks and recreation, open space and other total County needs.
- GOAL 8:** Encourage energy efficiency in new construction and in existing structures and consider actions to maximize the use of solar energy to take advantage of the county's favorable climate for solar space and water heating systems and for passive heating and cooling designs.

In order to work towards attaining these goals, a series of policies, quantified objectives and programs are set forth to guide the County's housing actions through 1995. The remainder of this chapter specifies the policies and objectives and summarizes the programs designed to implement the policies. Chapter 4 discusses strategies and implementation measures, and Chapter 5 details the housing problems and needs to which the policies, objectives and programs respond.

3. POLICIES, OBJECTIVES AND PROGRAMS

1. REHABILITATION

The most valuable housing resource the County has is its existing housing stock. U.S. Census data (1970 and 1980) and a 1968 housing inspection survey by the County all document the degree of less than standard housing in unincorporated Napa County. Over 2,000 units are more than 40 years old and about 500 units are estimated to be substandard.

Maintaining the existing housing supply involves both regular maintenance to prevent deterioration and rehabilitation of those units that have deteriorated beyond what normal maintenance would correct. Low and moderate income households - particularly the elderly on fixed incomes, handicapped, minorities, female-headed households and renters dependent on landlord actions - often find it difficult physical and/or economically to maintain or improve their housing. The high interest rates between 14% and 16% of home improvement loans prevalent between 1980 and 1985 have tended to inhibit these actions.

The County has received CDBG funds for assisting or encouraging the maintenance and rehabilitation of the existing housing stock. The following policies, objects and programs set forth a process whereby the County will continue to administer a voluntary housing inspection and rehabilitation loan program through the Housing Association for Napa Development (HAND), a local non-profit agency, to help maintain and improve housing occupied by low and moderate income households.

Policies

- 1.1 The County shall continue to periodically review and update the minimum standards for occupancy of existing housing.
- 1.2 The County shall continue and improve its program of housing surveillance to identify housing units that are below minimum standards of health, safety and welfare.
- 1.3 The County shall work to reduce substandard housing through rehabilitation which emphasizes the correction of deficiencies that are health and safety hazards.
- 1.4 The County shall seek to coordinate its housing rehabilitation efforts with those of other public and private agencies in Napa County.

Objectives

- 1.a The County will continue to review and adopt every three years, with local amendments, the most recent Housing Code recommended by the International Conference of Building Officials.
- 1.b The County will continue to inspect existing housing units that are identified as substandard.
- 1.c The County will reduce the 1643 units in moderate repair need to dilapidated condition in Napa County by the rehabilitation of 226 units by 1995.

Programs

The County will request the Napa Valley Housing Authority to continue to prepare applications for State and Federal Community Development Block Grant funding (as administered by the State) for the voluntary inspection and rehabilitation of the existing housing stock to be administered by the local, non-profit Housing Association for Napa Development (HAND). Through a contract with the County, HAND will develop a voluntary housing inspection and low-interest loan program designed to correct health and safety hazards in owner occupied and renter occupied housing in the unincorporated area of Napa County. Based on the availability of funds, a contract will be executed so that HAND can also utilize Farmers Home Administration low interest loan programs such as 502 and 504.

Through CDBG funding, the County has completed a survey of the conditions of the existing housing stock in the unincorporated area of the County. The County has subsequently received CDBG funds and will initiate a rehabilitation program.

2. AFFORDABILITY

Housing costs are a national, state and local problem that intensified between 1985 and 1989 due to increased land cost and increased construction cost. In 1989 the average building permit valuation of single family housing (excluding land) in the unincorporated area of Napa County exceeded \$250,000, up from \$166,000 in 1984, for a 51% increase. Under those circumstances it has been generally infeasible for the private market to produce moderate priced housing, let alone low cost housing.

Low cost housing cannot be provided by the private market even in normal market circumstances without some form of public participation. Moderate income housing can normally be provided with planning incentives enabled by State law.

Although County planning policies direct urban growth and services to urban areas, principally the area of American Canyon, Angwin and Deer Park, there is a need to solve housing problems occurring throughout the unincorporated areas within these policies. Special need groups, including farmworkers, particularly require County assistance.

Policies

- 2.1** The County shall work to reduce the cost of housing to low and moderate income households through available State and Federal rental and home ownership assistance programs.
- 2.2** The County shall encourage the construction of new affordable housing units in unincorporated areas where the necessary public and private services and facilities are available. These units shall be capable of purchase or rental by persons with low and moderate income. At least 15% of the housing units permitted each year shall be capable of purchase or rental by persons with average or below-average income. The income shall be based on the median income of residents of the County of Napa, based on the most recent United States Census.
- 2.3** The County will adopt in 1990/91 a density bonus program to provide for increased housing density within urban areas of the County in return for a long-term guarantee of housing units affordable to low and moderate income households.
- 2.4** The County will adopt in 1990/91 a small lot development program that, in conjunction with the density bonus program, will allow a reduction in lot size in return for the provision of long-term affordable units.
- 2.5** The County will continue the program to accumulate unused Category 4 building permits so that these permits can be made available to developers of affordable units.
- 2.6** The County shall encourage innovative housing designs that result in cost and energy savings, such as manufactured housing.
- 2.7** The County shall continue cooperative working relationships with other public and private groups to seek solutions to affordable housing needs.
- 2.8** The County will work with the cities to see that low and moderate cost housing is provided in proportion to the number of low and moderate income householders in Napa County.

- 2.9 The County will continue to encourage second, accessory units, such as "Granny Units", in suitable locations.
- 2.10 The County will encourage the inclusion of low/moderate income housing within larger residential projects

Objectives

- 2.a The County will assist an additional 100 low and very low income households with State and Federally-funded rental assistance by 1995.
- 2.b The County will encourage the construction of 182 units of moderate income "grandfathered" housing in American Canyon where water and sewer services are available by 1995.

Programs

The County will continue the program of low-income rental housing assistance with HUD funding, to be operated through the Napa Valley Housing Authority.

Consistent with the requirements of Slow Growth Initiative Measure "A", the County will reserve 155 of available building permits for "affordable" new housing developments. Factory-built, mobile homes and other housing types that reduce cost and energy use will be included in this process.

The County will adopt ordinances such as density bonus and small lot development ordinances which create incentives to the construction of affordable housing, where development agreements assure the units will remain affordable, which would: a) modify planning and zoning standards in urban areas where water and sewer services are available to allow higher density, and b) expedite review processing and allow for reduced and deferred fees.

The County will protect the affordability of existing low and moderate income rental units through rental assistance, and low interest rehabilitation loans.

The County will issue mortgage revenue bonds for new multi-family housing construction to provide moderate and low income housing.

The County will continue the program to accumulate unused Napa County Growth Management Category 4 building permits, and make them available to developers who provide affordable units.

The County will encourage large residential projects involving 10 or more units to reserve 15% of the units constructed to meet affordability guidelines as

specified by the Napa Valley Housing Authority.

The County will investigate an In-Lieu fee program for developers of new and expanded wineries, and for commercial and industrial developments, based upon the amount of new job demand.

3. SPECIAL NEEDS

There are specific types of households, as noted under the affordability heading, that require special assistance. Over 600 households are elderly or handicapped that require assistance. Over 700 large family households and over 159 female headed households need assistance. Over 400 minority families require help. Some 600 farmworker families need assistance. Each of these groups has unique circumstances, whether physical, social and/or economic, that require special programs and services.

In most cases some form of State or Federal funding assistance will be needed. In some cases the private sector can be a major participant such as housing for large families, farmworkers or the homeless. Intergovernmental cooperation will be needed for solving farmworker and housing for the homeless problems.

Policies

- 3.1 The County shall comply with and reinforce State and Federal regulations prohibiting discrimination in housing on the basis of ethnic background, age, sex, disability or marital status.
- 3.2 The County shall give priority in providing housing assistance to those groups with demonstrated special needs such as the elderly, disabled, large families, female-headed households, minorities, homeless and farm workers.
- 3.3 The County shall continue its inspection program to ensure that migrant farm labor housing is maintained to provide healthy and safe living quarters.
- 3.4 The County shall support emergency housing programs through public and private service agencies.
- 3.5 The County will continue to use its ordinance to encourage second accessory units, such as "granny apartments", in suitable locations.
- 3.6 The County will encourage temporary housing for farm laborers at periods of peak employment.

Objectives

3.a The County will assist a minimum of 250 households with special housing needs by 1995. Specifically, the County will continue to support the following agencies:

- (1) Napa Emergency Women's Shelter
- (2) Napa Valley Shelter System
- (3) Napa County Rental Information and Mediation Service

Further, the County will continue to approve second units and seek intergovernmental cooperative solutions to farm labor housing shortages.

A breakdown of the 250 households with special needs to be assisted is as follows:

- (1) Homeless - 100
- (2) Second units - 100
- (3) Rental Mediation - 50

Programs

The County will review reports of discrimination in housing made by individuals and agencies receiving complaints, such as Consumer Affairs, NCCEO, HAND, NCRIMS or the Napa Valley Housing Authority. If the severity of the problem warrants, an educational campaign will be initiated through joint action of the County, the media, the Board of Realtors and the Chamber of Commerce.

The County will seek funding for special needs groups incorporation with the existing governmental and non-profit agencies. Appropriate HUD, FmHA or HCD programs will be utilized to provide financial assistance.

The County will initiate a coordinated farm labor housing program with the cities of Napa County as well as providing assistance to private individuals and organizations in obtaining technical and financial assistance for private farm labor housing. Appropriate FmHA or HCD program assistance will be requested.

The County will continue its program of inspecting migrant farm labor camps through the Department of Environmental Health to ensure compliance with minimum state standards. Efforts will be made to seek compliance and not closure of such facilities.

The County, through the Napa Valley Housing Authority, the agricultural community, and participating non-profit organizations, will develop and encourage

self-help housing for farmworkers and efficiency units as minimal dwelling units for the elderly and young couples without children.

The County will seek to ensure coordination between County and other public and private assistance programs for those with identified special housing needs through Napa Valley Housing Authority.

The County will notify the public of available special assistance programs through the Napa Valley Housing Authority in coordination with the cities and other public and private agencies by the use of brochures and news releases.

4. FIVE YEAR HOUSING DEVELOPMENT

Over the five year period 1990-1995, the number of households in the County unincorporated area is expected to increase from 10,460* to 11,370 (a 1.7% annual increase). Employment is projected to increase Countywide from 52,900* to 58,300, a 2.0% annual increase. This indicates an apparent balance in the County between employment and housing development. Overall housing vacancy rates in the unincorporated area will continue near 9%.

Consistent with both ABAG's calculation of the unincorporated area's share of regional housing need, and the implementation of Slow Growth Initiative Measure A, the new construction housing need for 1995 is 1,357 units**. The two principal types of housing produced in Napa County unincorporated areas are single family and mobile homes.

The following policies are both consistent with County General Plan policies giving priority to agricultural land use and directing residential growth to urban areas while recognizing the needs of all economic segments of the County for increased housing opportunities.

Policies

- 4.1** The County shall work with the cities in Napa County to seek coordination of housing goals, policies, objectives and programs through the Combined Planning Commission Forum, Napa Valley Housing Authority and League of Municipalities.

* ABAG, Projections '90, pages 173-74.

** ABAG 1988 Housing heads determinations, page 29.

- 4.2 The County shall accommodate the distribution of population among the sub-areas of the County, giving preference to existing incorporated and urban areas in the construction of new housing.
- 4.3 The unincorporated County's principal long-term housing role, consistent with Slow Growth Initiative Measure A shall be to accommodate future residential development which constitutes an accessory use to agriculture (farm residence and farm labor quarters).
- 4.4 Housing units in the unincorporated County shall consist primarily of single family homes with multiple-family dwelling units confined to those areas which are best equipped to provide the level of services necessary to accommodate such development.
- 4.5 The County shall accommodate its share of regional housing need, and comply with Slow Growth Initiative Measure A.

Objectives

- 4.a The County shall make available up to 1,357 new construction dwelling unit permits over the five year period 1990-1995.
- 4.b The County's 5 year (1990-1995) housing objectives for new construction, rehabilitation and existing households are as follows:

FIGURE 15: FIVE YEAR HOUSING OBJECTIVES (1990-1995)

	EXISTING HOUSEHOLDS*	NEW CONSTRUCTION	REHABILITATION*
Above Moderate	--	529	--
Moderate Income	--	285	24
Low Income	75	231	13
Very Low Income	25	312	13
Total	100	1,357	50
* "Existing Households" or "Rehabilitation" objectives are only for the remaining portion of the five year period from 1990 to 1995.			

Programs

The County will coordinate its planning efforts with the general plan and zoning programs of the County's cities to ensure the various types of housing are provided to meet the County's housing needs.

The County will continue to implement Measure A to regulate the number of annual residential building permits granted by the County while meeting the needs of all income groups. The County will adopt ordinances which create incentives for the construction of affordable housing. (See page 61)

5. HOUSING LOCATION, DENSITY AND TIMING

County land use planning policies stress locating urban uses in urban areas and protecting the County's agricultural and environmental resources. Further, urban development is directed to areas with utility (water and sewer) availability. Within these policies the County is required to produce a variety of housing types to meet all income levels. The following policies and objectives are designed to address this requirement.

Policies

- 5.1** The County will enforce regulations which will encourage the concentration of urban density residential growth within the County's existing cities and urban areas. However, nothing in the Housing Element is intended to preclude the construction of a single family residence on an existing vacant legal parcel of land, or in areas designated for urban uses on the General Plan, in compliance with adopted County ordinances and other applicable regulations.
- 5.2** The County will assume that the density of urban development in the American Canyon Area precludes extensive future subdivision activity based on septic tanks and wells.
- 5.3** Residential Country areas close to the cities will be assumed to have a year-round rural residential orientation; further parcelization of these areas will be discouraged.
- 5.4** The overall extent of rural residential development in Capell Valley and the Lake Berryessa area will reflect the presumed recreational orientation and be different from the Napa Vicinity Residential country area. In the Berryessa area, timing will be integrated with recreational policies promulgated by the Bureau of Reclamation and State and Federal Water quality standards which are likely to change in time.

- 5.5 The County will promote development concepts including, but not limited to, bonus density and small lot development programs that create flexibility, amenities recommended in the General Planning Goals and Policies.
- 5.6 Urban Reserve Limits - The County will work with the cities, special districts, and Local Agency Formation Commission to define and establish the limits of current and future urban expansion and development. Unincorporated land included within the Rural Urban Limit Line of the 1983 Napa City's General Plan will not be further urbanized without annexation to the City, except that day care centers will be allowed inside the RUL.
- 5.7 The County will investigate methods to relieve housing pressure on Agricultural Lands through such techniques as the transfer of development rights to existing urban areas where public services are available.
- 5.8 The County will encourage the construction of residential units in commercial and industrial development to service jobs created by such development.

Objectives

- 5.a Rural residential development within the unincorporated County shall be accommodated primarily on existing vacant lots of record, in compliance with the County's Zoning and Subdivision ordinances.
- 5.b Maximum densities shall be in accordance with the Land Use Element as implemented by the Zoning Ordinance and will be reached only in urban areas where public water and sewer services are available.
- 5.c New construction in American Canyon through 1995 will be types of housing available to all income groups and represents 988 of the 1,357 units expected to be built in unincorporated Napa County.

Programs

The County will continue to work with the cities to define areas for future residential development.

Through the Growth Management System coupled with planning incentives such as density bonuses, selected rezonings to higher densities and second accessory units, the County will encourage moderate and low income new construction in the American Canyon area, as part of an economically balanced community

development which provides housing for all income levels.

6. URBAN FACILITIES AND SERVICES

Residential development in Napa County has been predominantly of the type and location that is self-sufficient as far as water and sewer by the use of on-site septic and water systems designed to County standards. County service areas have rarely been used with only one in operation in American Canyon. Local community service districts, such as the American Canyon County Water District which is self-governing, have also been rarely used. Approved residential developments in American Canyon and Lake Berryessa must use one of these two forms of service providers.

Policies

- 6.1 The County will encourage annexation to existing cities for proposed developments where urban services and facilities are required as opposed to creating special districts to accommodate such projects.
- 6.2 The County will discourage proposed developments which require urban services and which are not proposed for urbanized areas.
- 6.3 Existing utility systems will be used as much as possible to maximize the use of existing services and facilities and to provide a broader user base to insure the adequate maintenance and operation of such facilities.
- 6.4 Where urban areas lack full urban services, the County will encourage means of area-wide provision of such services.
- 6.5 That part of the Angwin Area Consisting primarily of the Pacific Union College development should have full urban services.

Objectives

None.

Programs

The County will work with owners of existing utility systems to improve existing services and facilities.

The County will assist in the development of area-wide provision of services in urban areas lacking full urban services.

7. GOVERNMENTAL CONSTRAINTS

The County influences some aspects of housing costs directly and indirectly through planning, engineering and building fees, site improvement standards, processing procedures for permits and planning standards and controls. Modification of these constraint on a case by case basis for achieving low and moderate income housing needs is the intent of the following policies.

Policies

- 7.1 The County will reduce planning, engineering and building fees for new residential construction in proportion to the low and moderate income housing needs to be satisfied.
- 7.2 The County will continue to expedite permit processing.
- 7.3 The County will, where appropriate, modify on a case by case basis planning and engineering standards to reduce the costs when of benefit to low and moderate income households.
- 7.4 The County will ensure that the relaxation of governmental standards and fees will only be granted when satisfactory legal steps are taken to pass on benefits to low and moderate income households.

Objectives

Quantified objectives cannot be identified at this time.

Programs

The County Planning Commission will hold study sessions with representatives of appropriate County departments and solicit input from private sector individuals involved with housing construction to develop a process for reducing specific government constraints to producing low and moderate income housing.

8. ENERGY CONSERVATION

Housing and energy conservation are related on two levels: land use and individual buildings. Napa County's adopted Energy Policy *states, "Urban sprawl generally increases the distances people must travel to work, school, shopping and recreation centers and increases the distances that must be traveled by personnel providing services to these areas, thus increasing expenditures of

*Adopted by BOS March 4, 1980

energy for transportation.

The policy goes on to state that most existing buildings "were built during the times of bountiful energy supplies and use vast amounts of energy needlessly". New buildings, on the other hand, can be designed and constructed with energy conservation in mind and placed on the land with energy saving as a goal".

Policies

- 8.1** In its land use policies the County will encourage the use of existing urban areas when planning for development of urban densities and services.
- 8.2** In its site development standards for residential plans the County will promote and encourage energy-efficient design and landscaping to reduce the use of fossil fuels and encourage utilization of solar energy, through such means as solar access design, shading standards, modified parking standards, reduced street widths, and mixed-use guidelines.
- 8.3** In its building codes and their enforcement the County will encourage and provide incentives for retro-fitting existing buildings and designing new buildings to reduce the use of fossil fuels through energy conservation and the utilization of renewable resources.

Objectives

- 8.a** The County will assist 50 households of low and moderate income, with priority for the elderly and handicapped, to retro-fit their homes.
- 8.b** The County will ensure that all 1,357 new housing units to be constructed will maximize opportunities for energy efficiency.

Programs

Through a contract with the local non-profit Housing Association for Napa Development, the County will provide funding from State and Federal grants to insulate and weatherstrip homes occupied by low and moderate income households.

The County will continue to provide energy conservation assistance to home owners, architects, developers and contractors.

FIGURE 17: SUMMARY OF HOUSING ELEMENT HOUSING PROGRAM ACTIONS

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE
REHABILITATION						
1.1	Housing Code	Adopt most recent housing	Review, amend and adopt	Normal County budget	Building Division, CDPD	Every 3 years
1.2	Housing Surveillance	Inspect existing housing units	Voluntary inspection program	Federal (CDBG)	BOS contract with HAND	Ongoing
1.3	Rehabilitation	Rehabilitate 50 units	Voluntary rehabilitation program	Federal (CDBG) FmHA 502/504	BOS contract with HAND	Implement by 7/1/87
1.4	Coordinate Rehabilitation	None	Ongoing inter-governmental	Normal County budget	NHA/CDPD	3/1/87
AFFORDABILITY						
2.1	Use Federal Assistance Programs for renter of existing units	Assist 100 low/very low income rental households*	Rental subsidy	Federal Sec. 8	NHA	Ongoing
2.2	New affordable units in American Canyon	Construct 376 affordable units	Below market interest mortgage money	Tax Exempt Mortgage Revenue bond (TEMRB)	BOS/NHA	9/1/87
2.3	Variety of least cost housing	Factory-built; mobile homes; innovative design; second units	Density bonus; development agreement; reduce fees	Normal County budget; TEMRB	CDPD/NHA	Ongoing
2.4	Coordinate affordable housing		On-going inter-governmental advisory group	Normal County budget	BOS NVHA	Ongoing
*during remaining portion of five year period 1986-1990.						
2.5	Local fair-share of low and moderate-income housing		On-going inter-governmental advisory group	Normal County budget	BOS NVHA	Ongoing

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE
2.6	Encourage second units		Implement Ordinance	Normal County budget	CDPC	Ongoing
2.7	Develop & Implement Density Bonus & Small Lot Development Program	Encourage long-term housing units affordable to low & moderate income housing	Implement Ordinance	Normal County Budget	CDPC/BOS	12/90
SPECIAL NEEDS						
3.1	Reinforce Fair Housing laws		Referral to enforcement agency	Normal County budget/State and Federal funds	NHA/District Attorney's office/NCRIMS	Ongoing
3.2	Priority to Special Needs	Assist 250 households	Various	State HCD; FmHA; HUD CDBG; Second Units	BOS NVHA	Ongoing
3.3	Migrant farm labor housing inspection	Inspect existing housing units	Continue existing program	Normal County budget	Environmental Health Division, Dept. of Health	Ongoing
3.4	Support emergency housing programs	As need arises		HUD CDBG	BOS NVHA	Ongoing
3.5	Encourage second units		Implement ordinance	Normal County budget	CDPC	Ongoing
FIVE YEAR HOUSING DEVELOPMENT						
4.1	Coordinate housing goals		On-going inter-governmental coordination	Normal County budget	BOS NVHA	Ongoing
4.2	Preference to incorporated/urban areas	Issue permits for up to 1,833 new housing units	Planning Process	Normal County budget	CDPD	Ongoing
4.3	Agriculture is primary land use		Planning Process	Normal County budget	CDPD	Ongoing
4.4	Primary single family housing		Planning Process	Napa County budget	CDPD	Ongoing

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE
4.5	Comply with Measure A/ Housing Need Report	1,357 new units between 1990 and 1995	Planning Process	Napa County budget	CDPD	Ongoing
HOUSING LOCATION, DENSITY AND TIMING						
5.1	Urban density regulations		General Plan/ zoning conformance	General County budget	CDPD	Ongoing
5.2	American Canyon public services		Zoning	General County budget	CDPD/PWD	Ongoing
5.3	Residential County areas		Inter-governmental coordination/ specific plans	General County budget	CDPD	Ongoing
5.4	Capell/ Berryessa rural residential development		Local planning process	General County budget	CDPD	Ongoing
5.5	Development Concepts		Local planning process	General County budget	CDPD	Ongoing
5.6	Define urban reserve areas		Local planning process	General County budget	CDPD/LAFCO	Ongoing
URBAN FACILITIES & SERVICES						
6.1/ 6.2/ 6.3/ 6.4	Annex for urban services		Develop/ improve urban area services	General County budget	CDPD/PWD	Ongoing
6.5	Angwin area urban services		Develop urban services	General County budget	CDPD/PWD	Ongoing
GOVERNMENT CONSTRAINTS						
7.1	Reduce fees for low/ moderate income housing	Reduce cost of housing to consumer	Establish criteria/process to reduce/waive fees	General County budget	BOS	10/90

PLAN POLICY		PLAN OBJECTIVE	ACTION STEP	SOURCE OF FINANCING	ACTION AGENCY	ACTION DATE
7.2	Modify application/processing procedure for low/moderate income housing	Reduce cost of housing to consumer	Establish adoption criteria of policy		BOS	Ongoing
7.3	Modify standards for low/moderate income housing	Reduce cost of housing to consumer	Establish criteria/process to use new standards		CDPD/PWD	12/90
7.4	Benefits for low/moderate income housing	Reduce cost of housing to consumer	Establish methods to insure benefits	General County budget	CDPD/PWD	6/1/87
ENERGY CONSERVATION						
8.1	Use of existing urban areas	Reduce energy costs	Local planning process		CDPD	Ongoing
8.2	Modify site development standards	Reduce energy costs	Local planning process		CDPD/PWD	12/90
8.3	Encourage retrofitting of existing housing	Reduce energy costs	Local building code process		HAND/NVHA/BOS	Ongoing
KEY: CDPD - Conservation Development & Planning Department CDPC Conservation, Development & Planning Commission CDBG - Community Development Block Grant HAND - Housing Association for Napa Development PWD - Public Works Department NVHA - Napa Valley Housing Authority BOS - Board of Supervisors LAFCOM - Local Agency Formation Commission						

4. IMPLEMENTATION METHODS

The development of a housing program for Napa County involved a process of (1) identifying priorities based upon needs identified in Chapter 5, Housing Problems; (2) translating the general goals statements to policies and objectives, and (3) linking specific action programs to the objectives which will implement the policies.

The County's local goals, policies and objective should be consistent with the following broad policy objectives of Section 65580 of the State Housing Element law:

- (a) The availability of housing is of vital statewide importance, and the early attainment of decent housing and a suitable living environment for every California family is a priority of the highest order.
- (b) The early attainment of this goal requires the cooperative participation of government and the private sector in an effort to expand housing needs of Californians of all economic levels of government.
- (c) The provision of housing affordable to low- and moderate-income households requires the cooperation of all levels of government.
- (d) Local and state governments have a responsibility to use the powers vested in them to facilitate the improvement and development of housing to make adequate provision for the housing needs of all economic segments of the community.
- (e) The Legislature recognizes that in carrying out this responsibility, each local government also has the responsibility to consider economic, environmental, and fiscal factors and community goals set forth in the General Plan and to cooperate with other local governments and the State in addressing regional housing needs.

The County's policies should also address preserving housing, preserving affordability, plans for adequate sites, accessibility (including non-discrimination) and adequate provisions for the housing needs of all economic segments of the community.

IMPLEMENTING HOUSING POLICIES

Once a set of policies is adopted, the next step becomes a determination of the ability of the County to implement each policy. The ability of the County to implement each policy relates to the available means, the cost, and the relationship to other housing goals. The means of implementation can be grouped into four categories as set forth below.

1. Influencing the Quality and Price:

- a. Public Services - providing adequate sewer, water and other public services.
- b. Real Estate Taxes - providing tax abatement for rehabilitation or deferring tax increases for the elderly.
- c. Local Government Regulatory Powers - providing "tradeoffs" to require or encourage lower cost housing (density bonus).
- d. Loans and Grants - direct loans or grants to reduce land costs, site improvements or financing for housing.

2. Influencing Supply

- a. Low Income Housing Construction - directly through a housing authority or by loans, grants or incentives to non-profit groups.
- b. Financing Incentives and Mechanisms - reduction of interest rates, sale of mortgage revenue bonds or leveraging of private funds.
- c. Redevelopment Incentives - reduction in cost of land, provision of site improvements or amalgamation of land parcels.

3. Influencing Demand

- a. Housing Allowances - direct housing rental subsidies.
- b. Social Services & Public Assistance - freeing up other income for housing payments.
- c. Economic Development & Job Training - increasing ability to earn income and afford higher cost housing.
- d. Relocation Payments - rental or repurchase assistance to enable affordability when displaced by government programs.

4. Influencing Institutions

- a. Combating Redlining - making private loan funds available in marginal or transition areas.
- b. Loan Pools - several banks "pool" money for loans to higher risk

owners and thereby spread their risk.

- c. Government Induced Lending - leveraging with public deposits and use of pension funds.
- d. Programs Directed at Realtors - educational or non-discrimination programs.
- e. Housing Dispersal - community reinvestment policies.

LEVERAGING

An important concept in private enterprise is leveraging, the investment of equity money to pry additional borrowed funds loose for added investment. The simplest analogy is a down payment for a house. A twenty percent down payment of \$20,000 on a home selling for \$100,000 pries loose \$80,000 in borrowed funds. The same concept can be applied to local government whereby the investment of local public funds can release additional private or public money. The less government must invest in a given program and the more private capital it generates, the further it can stretch its limited resources. Accordingly, the County should consider doing the following:

1. Minimize its dollar investment as a portion of the total cost of implementing any housing or development program;
2. Minimize the time period of its involvement in any given aspect of a housing program. The shorter the period of time over which the County is involved in a program, the sooner its funds will be free to invest in other projects;
3. Give the highest priority to programs which generate continued private investment in the County without further involvement by the County; and
4. Select programs that complement one another so that the success of one program makes the success of others undertaken by the County in other areas easy to accomplish. This means that the County should select programs within the context of an overall strategy so that individual programs complement each other, making the total program less difficult to implement.

DEVELOPING A HOUSING STRATEGY

Developing a housing strategy for the County of Napa is really developing a set of strategies that recognizes the dynamic relationship between the County's

housing stock, population and jobs. Also inherent in this approach is the concept of housing as a bundle of services, as set forth in the section on the County's Housing Problem.

In this context a set of strategies implies involvement by public and private individuals and institutions who have an opportunity to influence the local housing market. Not only local elected officials and administrators need to be involved, but private sector representatives, such as lenders, realtors, developers, builders, housing consumers and other housing-oriented groups, should also be involved.

The recommended strategy for Napa County involves the identification with the private sector of those strategic points in the free market system where government intervention will contribute to meeting the County's goals and policies for lower and moderate income housing.

HOUSING INTERVENTION TECHNIQUES

Before the County can put together its set of housing strategies in cooperation with the private sector, a basic overview of techniques for intervention would be helpful. The following techniques are not presented in any priority or with any preference. The use of several techniques will be suggested as the foundation for the County's housing strategies.

- A. Direct Subsidy Mechanisms - designed to increase the ability of lower and moderate income tenants and home buyers to compete for sound, private market housing.
 - 1. Production related, housing assistance programs - traditional public housing, low interest loans to developers or mortgage insurance.
 - 2. Non-production related, housing assistance programs - low income housing rental payments.
 - 3. Tax abatement - deferring tax increases for rehabilitation or elderly owners.
 - 4. Direct grants - for rehabilitation, or relocation.
 - 5. Land write-down - to lower cost of land by public purchased at fair market value and sale at below market value.
 - 6. Landbanking - public agency purchase of developable land for future housing.

7. Sale of excess public land at below market value.
- B. Financing Mechanisms** - designed to increase the availability of mortgage and home improvement credit for homebuyers, home owners rehabilitating their homes and developers in the low and moderate income market.
1. State Housing Finance Agency - loans to developers and owners at low interest with funds derived from State general funds and sale of revenue bonds.
 2. Public sector loans - similar to above.
 3. Private sector loan of "public" money - tax free loans by pass through public agency.
 4. Mortgage insurance - traditional FHA insurance or private insurance.
 5. Pension funds - housing loans from pension funds.
 6. Mortgage Revenue Bonds - local agency sale of revenue bonds for home purchase loans.
- C. Technical Service** - designed to expand home ownership opportunities, increase tenant responsibilities and prevent failure of local housing programs.
1. Home buyer counseling - including budgeting, maintenance and financing.
 2. Tenant services - also includes budgeting.
 3. Housing Discrimination information and referral - primarily informational.
 4. Owner/management assistance - training for multi-family management.
 5. Rehabilitation assistance - "how to" training, materials sources, financing, etc.
 6. Maintenance training - taking care of housing to avoid deterioration and costly repair.

- D. Public Development Agencies - direct public development, ownership and management of lower income housing.
1. Local housing authority - provides rental assistance payments or loans funds and builds publicly owned low income housing.
 2. Quasi-public development corporation - such as Napa's Housing Association for Napa Development.
- E. Regulatory Tools - designed to influence the impact of natural market forces in order to improve or protect the housing condition of lower and moderate income households.
1. Rent controls - protect tenants from rent increases.
 2. Displacement or eviction controls - control rental to condominium conversions.
 3. Housing condition controls (housing codes) - inspection and enforcement of housing codes.
 4. Development regulations - encouraging or requiring moderate income housing in new developments.

The final step in developing the County's Housing Program is to interrelate goals, policies, priority households and intervention techniques into an action program which would implement this Housing Element. Chapter 3 outlines and summarizes the County's Housing Action Program in terms of policies, objectives, programs, financing source, responsible agency and a time frame.

5. ANALYSIS OF HOUSING PROBLEMS AND NEEDS

To understand the types and degrees of housing needs in Napa County, an understanding of housing-related data is necessary. This section of the Housing Element reviews population, household, housing and housing market characteristics of Napa County and its municipalities as background to identifying the housing needs in the County. The data source includes the 1975 Special Census for the County and its urban area, 1970 and the 1980 U.S. Census, California Department of Finance controlled population estimates and reports by ABAG ("Projections '90" and September 1988 "Housing Needs Determinations").

Population Characteristics

The current and forecast population of Napa County is presented in figure 18. Consistent with County Planning policies, future urban growth is expected to occur within the four cities and the three unincorporated urban areas. Fluctuations in unincorporated population are explained by:

- A) Annexation of incorporated "islands" to the City, which, between 1980 and 1985, transferred approximately 1500 residents from "Total Unincorporated" to "City of Napa". During the period 1985-1990, 694 acres were annexed. Future incorporation of American Canyon would similarly lower the unincorporated population;
- B) Additional dwelling units (see pp. 122-123); and
- C) Fluctuations in the number of persons per household, which varies by neighborhood (see Figure 21) and age of neighborhood; but has tended to decline, historically.

FIGURE 18: NAPA COUNTY POPULATION: 1980-1990

JURISDICTION	1980 ¹	1990 ²
Total Unincorporated	36,650	30,800
American Canyon	5,712	7,200
Angwin	3,526	N/A
Deer Park	1,454	N/A
Remainder Unincorporated	25,958	N/A
City of Napa	50,879	65,500
Yountville	2,893	3,100
St. Helena	4,898	5,100
Calistoga	3,879	4,400
TOTAL	99,199	108,900
¹ April 1, 1980 U. S. Census ² ABAG Projections '90, page 172		

Source: CDPD, 1990

Another population characteristic pertinent to housing is age of population. Figure 19 presents data on age groupings by sex in 1980 in the various areas of Napa County.

FIGURE 19: AGE AND SEX OF POPULATION, 1980

		AGE					TOTAL
		0-17	18-34	35-59	60-64	65 +	
American Canyon	(M)	853	637	884	165	285	2,824
	(F)	777	630	958	178	345	2,888
Angwin	(M)	254	1,051	242	40	96	1,683
	(F)	298	1,015	293	51	186	1,843
Deer Park	(M)	150	175	160	43	115	643
	(F)	165	190	198	50	208	811
Unincorporated Remainder	(M)	3,201	3,643	4,145	745	1,629	13,363
	(F)	3,030	3,140	3,959	743	1,723	12,595
City of Napa	(M)	6,795	7,251	6,684	1,041	2,453	24,224
	(F)	6,744	7,509	7,188	1,276	3,938	26,655
Town of Yountville	(M)	140	207	378	243	956	1,924
	(F)	110	169	227	91	372	969
City of St. Helena	(M)	512	549	516	131	547	2,255
	(F)	461	504	604	193	881	2,643
City of Calistoga	(M)	340	444	374	101	555	1,814
	(F)	353	370	426	177	739	2,065
COUNTY TOTAL	(M)	12,245	13,957	13,383	2,509	6,636	48,730
	(F)	11,938	13,527	13,853	2,759	8,392	50,469

Source: 1980 U. S. Census

A third important characteristic of the population is racial or ethnic makeup. Figure 20 identifies the racial characteristics of Napa County and its urban communities. The data indicate the largest minority population as being Spanish origin with a concentration in the City of Napa.

FIGURE 20: NAPA COUNTY MINORITY POPULATION, 1980

	BLACK	AMERICAN INDIAN	ASIAN	SPANISH	OTHER
American Canyon	244	49	502	383	193
Angwin	95	9	235	189	153
Deer Park	13	5	32	86	28
Unincorporated Remainder	37	188	348	2,144	1,157
City of Napa	99	408	912	4,165	2,039
Town of Yountville	28	26	24	208	131
City of St. Helena	24	14	25	793	532
City of Calistoga	7	26	17	698	403
COUNTY TOTAL	887	725	2,095	8,636	4,636

Source: 1980 U. S. Census

HOUSEHOLD CHARACTERISTICS

General household characteristics in Napa County are illustrated in Figure 21 for the year 1980.

FIGURE 21: NAPA COUNTY HOUSEHOLD CHARACTERISTICS, 1980

	Housing* Units	Number of Households	Household Population	Population per Household	Group Quarters
Total County	38,405	36,667	93,361	2.55	5,888
City of Napa	20,220	19,758	50,252	2.55	627
Yountville	795	774	1,538	1.99	1,355**
St. Helena	2,242	2,151	4,795	2.23	103
Calistoga	1,911	1,825	3,790	2.08	89
Unincorporated Area	13,237	12,132	32,986	2.72	3,714
American Canyon	2,015	1,944	5,597	2.88	113
Angwin	810	73	2,174	2.81	1,371***
Deer Park	567	551	1,384	2.51	75
Remainder Unincorporated	9,845	8,864	23,831	2.69	2,155****

Source: 1980 U. S. Census

- * Excludes vacant seasonal and migratory
- ** Includes California Veterans Home population
- *** Includes Pacific Union College student population
- **** Includes Napa State Hospital population

The data indicates that the American Canyon unincorporated area of the County has the largest average population per household in the County while Yountville has the smallest. Included in the group quarters in the unincorporated area are patients and employees residing at Napa State Hospital and students at Pacific Union College in Angwin.

The income ranges for households in the unincorporated areas of Napa County for 1979 are reflected in Figure 22. With the 1980 U.S. Census poverty line just below \$7,500 annual income, a total of nearly 1,686 households in the unincorporated area were below the poverty level. Some 1,236 or 73% of the unincorporated area poverty households were in the rural, non-urban areas. Of the three urban areas, American Canyon had the highest number, 285. The relationship between household income and monthly housing cost is presented in Figures 37 and 38 on pages 106 and 107.

FIGURE 22: HOUSEHOLD INCOME, INCORPORATED AREAS, 1979

NUMBER OF HOUSEHOLDS					
	Total Unin- corporated County	American Canyon	Angwin	Deer Park	Unincorp- orated Remainder
Less than \$2,500	409	60	56	0	293
2,500-4,999	596	69	55	13	459
5,000-7,499	681	156	19	22	484
7,500-9,999	763	147	48	48	520
10,000-14,999	1,598	184	111	110	1,193
15,000-19,999	1,747	293	160	68	1,226
20,000-24,999	1,515	356	91	54	1,014
25,000-29,999	1,195	215	66	61	853
30,000-39,999	1,814	285	88	72	1,369
40,000-49,999	806	107	42	26	631
50,000 +	1,008	72	37	77	822

Source: 1980 U. S. Census

HOUSING CHARACTERISTICS

The housing market in Napa County is dominated by the City of Napa and its urban fringe. Other urban concentrations are found in American Canyon, Angwin, Deer Park and the three upvalley Cities of Yountville, St. Helena and Calistoga. Between 1970 and 1980, a period of significant growth in Napa County, the total number of dwelling units in the County as a whole increased by 43 percent from 26,838 to 38,404.

Figure 23 indicates the types of dwelling units in unincorporated Napa County in 1980. In the unincorporated area the only unusual ratios of types of structures are the high number of mobile homes in American Canyon and the high number of two to four unit multiple dwellings in Angwin. American Canyon also has a low percentage of multiple family units, less than 3% as compared to 19% Countywide.

FIGURE 23: DWELLING UNIT BY TYPE OF STRUCTURE NAPA COUNTY, 1980

	Single Family	2-4 Plex	5 Plex +	Mobile Home	Total Units
Total County	28,265	3,081	4,224	2,834	38,404
City of Napa	14,914	1,968	2,486	850	20,218
Yountville	475	32	55	229	791
St. Helena	1,510	104	537	96	2,247
Calistoga	1,085	123	270	426	1,904
Unincorporated Areas:	10,281	854	876	1,233	13,244
American Canyon	1,241	21	39	714	2,015
Angwin	485	268	18	39	810
Deer Park	425	87	32	23	567
Remainder	8,130	478	787	457	9,852

Source: 1980 U. S. Census

FIGURE 24: NAPA COUNTY DWELLING UNITS BY TENURE, 1970 AND 1980

	Total County		Unincorporated County		City of Napa		Incorporated Balance	
	1970	1980	1970	1980	1970	1980	1970	1980
Owner Occupied	16,888	23,894	7,619	8,983	7,821	12,098	1,448	2,812
Renter Occupied	8,210	12,730	2,809	3,218	4,351	7,616	1,050	1,806
Vacant For Sale	255	313	111	94	130	150	14	49
Vacant For Rent	489	253	113	53	255	147	121	62
Not Available	996	1,214	656	895	165	209	12	129
TOTAL	26,838	38,404	11,308	13,243	12,722	20,220	2,645	4,948

Source: 1970 U.S. Census
1980 U.S. Census

FIGURE 24(a): UNINCORPORATED NAPA COUNTY DWELLING UNITS BY TENURE, 1980

	Total Unincorporated County	American Canyon	Angwin	Deer Park	Unincorporated Remainder
Owner Occupied	8,983	1,729	402	369	6,483
Renter Occupied	3,218	240	380	169	2,429
Vacant for Sale	94 (1.0%)	25 (1.4%)	11 (2.7%)	4 (1.1%)	54 (.8%)
Vacant for Rent	53 (1.6%)	0 (0%)	8 (2.1%)	0 (0%)	45 (18%)
Not Available	895	21	9	25	840
	13,243	2,015	810	567	9,851

Source: 1980 U.S. Census

In terms of housing tenure, owner-occupied tenure increased by 7,006 units County-wide between 1970 and 1980 with the City of Napa dominating by 61 percent of the total increase (see Figure 24). Renter-occupied units increased by only 4,520 units County-wide with 72 percent in the City of Napa. A further breakdown of tenure for unincorporated areas is found in Figure 24(a). Whereas throughout Napa County there is one renter occupied unit for each two owner occupied, in the unincorporated area the ratio is one renter for each three owners. In Angwin the ratio is nearly fifty-fifty while in American Canyon the ratio is about one renter for seven owners. The vacancy rate in 1980 was extremely tight in all unincorporated areas with no rental vacancies in American Canyon and Deer Park to a high of only 2.7% vacant for sale in Angwin. An estimated 14% of single family homes in the unincorporated area are renter occupied due to the low ratio of multiple family units in the unincorporated area.

PROJECTED POPULATION AND HOUSEHOLDS

This Housing Element utilizes population, employment and housing projections supplied by ABAG in "Housing Needs Determinations, San Francisco Bay Region" (September 1988) and "Projections '90" (September, 1989).

ABAG's 1988 "Housing Needs Determinations" report specifies local shares of regional housing need which each local government must address. ABAG's determination of local shares takes into account market demand for housing, employment opportunities, availability of suitable sites and public facilities, commuting patterns, type and tenure of housing need and the housing needs of farmworkers, as required by Gov. Code Section 65584. Each local government's housing element shall include an assessment of its share of regional housing need, as required by Gov. Code Section 65583. This Housing Element accepts and discharges that responsibility; pages 122-125 of this Housing Element indicate

how Napa County accommodates its share of regional housing needs. Figure 48 (page 125) indicates a net addition of 1835 D.U. in the unincorporated area's regional housing needs share (see page 123).

ABAG's "Projections '90" is the most recent report in a continuing series of population, employment and housing projections (Series I, Series II, Series III, Projections '79, Projections '83, Projections '85). These projections generally attempt to illustrate the probable outcome over the next 20 years of national, statewide and regional trends, as modified by local development policy. This Housing Element treats the figures contained in Projections '90 not as policy, but as the most probable future for 1995.

Figure 25 indicates that this Housing Element addresses an unincorporated area housing need of 1357 D.U. (see also pages 122-125). (For additional information on projected population and households, see pages 63, 80, 83, 116, 122, 125.)

FIGURE 25: NAPA COUNTY UNINCORPORATED HOUSING NEED, 1988-1995 (INCLUSIVE)

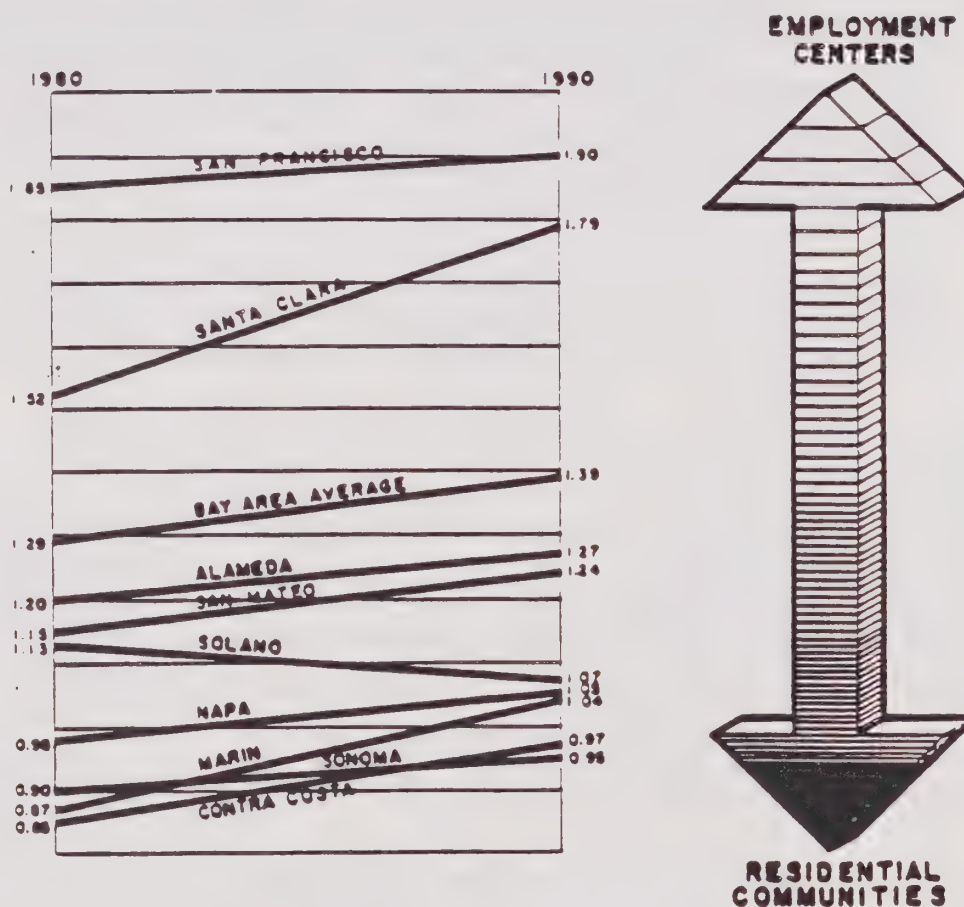
Projected need, 1988-1995 ¹ :	1357 D.U.
Net addition in housing stock 1/88-12/89 ²	-864 D.U.
Remaining housing need 1/90-12/95:	493 D.U.
¹ ABAG "Housing Needs Determinations..." September 1988, page 12.	
² Napa County C.D.P.D. building permit records.	

Source: CDPD, 1990

There are about 1/3 more jobs than households in the Bay Area, and in relative terms Figure 25A shows Napa County is more a residential community than a job center. Analysis of ABAG's projections through year 2005 shows a continuing rise in Napa's J/H ratio; but no relative change in its similarity to the residentially-oriented North Bay Counties of Marin, Contra Costa, Solano and Sonoma and its dissimilarity to the employment centers of San Francisco and Santa Clara County.

A severe imbalance between jobs and housing can lead to problems and costs such as increased traffic congestion at major employment centers, increased air pollution and energy uses, increased housing costs where job growth greatly outpaces housing growth and inability to provide public services. The data for Napa County indicate a slight imbalance of net out-commuting that will barely change by the year 1990. The ABAG report notes that cross-commuting between communities is a basic feature of large metropolitan areas.

FIGURE 25A: JOBS/HOUSEHOLD RATIOS, BAY AREA, 1980 AND 1990



Source: CDPD, based on ABAG's Projections '85

**FIGURE 26: FORECAST EMPLOYMENT BY INDUSTRY AND OCCUPATION,
NAPA COUNTY, 1990, 1995**

	1990	1995
Agriculture, Mining	3,340	3,410
Construction	3,130	3,300
Manufacturing	6,030	7,050
Transp., Comm., Utilities	1,430	1,680
Wholesale Trade	1,450	1,950
Retail Trade	8,690	9,850
F.I.R.E.	1,840	2,030
Services	19,170	21,480
<i>Business Services*</i>	<i>1,280</i>	<i>1,480</i>
Government	2,020	2,040
TOTAL	47,100	52,790
<i>*Not included in totals.</i>		

Source: ABAG Projections '90, page 161

FIGURE 27: WAGE AND SALARY EMPLOYMENT, NAPA COUNTY, 1985-1987

	ACTUAL	FORECAST	
	12/1985	12/1986	12/1987
Total, all industries	37,400	38,200	38,900
Agricultural employment	2,200	2,200	2,200
Nonagricultural employment	35,200	36,000	36,700
Mining & construction	1,900	1,900	1,900
Manufacturing	4,500	4,600	4,700
Durable goods	1,300	1,300	1,300
Nondurable goods	3,200	3,300	3,400
Food & kindred products	2,200	2,200	2,300

	ACTUAL	FORECAST	
	12/1985	12/1986	12/1987
Other nondurable goods	1,000	1,100	1,000
Transportation & Public Utilities	1,100	1,100	1,100
Wholesale trade	900	900	900
Retail trade	6,900	7,100	7,400
Food stores	1,400	1,400	1,500
Eating & drinking places	2,500	2,600	2,700
Other retail trade	3,000	3,100	3,200
Finance, insurance & real estate	1,300	1,300	1,300
Services	10,500	11,000	11,300
Health	3,500	3,700	3,900
Other services	7,000	7,300	7,400
Government	8,100	8,100	8,100
Federal	300	300	300
State and local	7,800	7,800	7,800
/1/ Employment reported by place of work and does not include persons involved in labor-management trade disputes.			
/2/ Parts may not add to totals due to independent rounding.			

Source: Employment Development Department, March, 1985 benchmark

FIGURE 27a: TOTAL EMPLOYMENT, NAPA COUNTY, 1980- 1995

	1980	1985	1990	1995
Napa County Total	35,870	39,920	47,100	52,790

Source: ABAG, Projections '90, page 161.

HOUSING CONDITIONS

Two useful measures of housing condition are the age of housing and direct evaluation by housing inspection official. Figure 28 below indicates the year structures were built in the unincorporated areas of Napa County based on the

1980 U.S. Census. The numbers indicate that in the unincorporated area there are 2,280 structures over 40 years of age. Of these, 1,966 or 86% are in the unincorporated remainder or rural areas of the County. Unless maintained the older housing stock can pose health, safety and welfare problems for occupants. Figure 30 on page 94 illustrates the relationship between age of housing, level of maintenance and condition. Even with normal maintenance, dwellings over 40 years of age can develop major deterioration.

FIGURE 28: YEAR STRUCTURE BUILT, NAPA COUNTY UNINCORPORATED AREAS

	Total County	Unincor. Remainder	American Canyon	Angwin	Deer Park
1970-80	11,360	2,208	723	174	83
1960-69	8,578	1,882	554	213	160
1950-59	7,911	2,354	661	183	83
1940-49	4,564	1,442	43	127	74
1939 and before	5,991	1,966	34	113	167

Source: 1980 U.S. Census

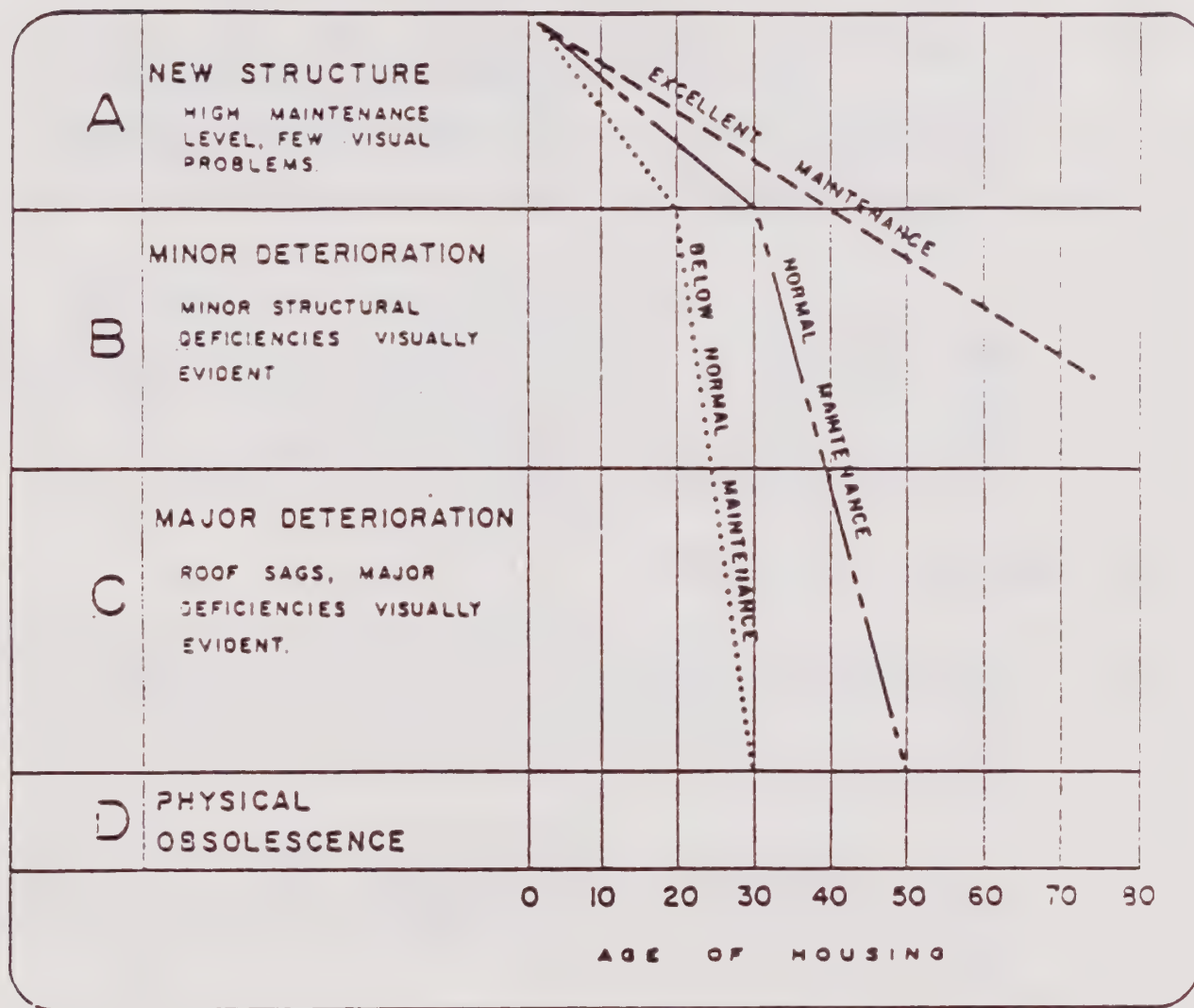
A more precise but outdated assessment of building conditions is obtained from inspections performed by County housing inspectors after the 1968 Special Census. Figure 29 had presented data from the 1977 Housing Assistance Plan based upon the County inspections. The data is 22 years old as far as the number of substandard and needing rehabilitation counts. Consequently, the table probably under estimates the number of dilapidated and deteriorated units in the unincorporated area on Napa County due to the continuing aging of the older housing stock since 1968, particularly those structures built before 1940, assuming the quantity of deterioration exceeds the quantity of renovation in the intervening 22 years. Figure 29 below replaces the previous data and provides a current number of substandard and rehabilitation needs count. Thirty-seven percent (37%) of the units in the American Canyon target area were found to be in need of rehabilitation. There were no houses rated under the catagories of substantial or dilapidated in the area.

FIGURE 29: HOUSING CONDITIONS - UNINCORPORATED AREA, 1989

Survey Area:	Angwin	Rutherford Oakville	Coombsville	Cuttings Wharf Old Sonoma Congress Valley	Lakoya	American Canyon	Lake Berryessa	County-wide Totals
TYPE								
A	14	1	1	3	0	0	0	19
C	1	60	0	7	6	0	0	74
D	37	16	20	30	0	6	0	109
F	0	0	0	0	0	0	0	0
H	0	0	0	0	0	0	0	0
L	1	17	0	9	1	0	0	28
M	96	18	6	45	0	796	1250	2211
P	0	0	0	0	0	0	0	0
R	0	0	0	0	0	0	0	0
S	1205	607	893	452	325	1676	491	5649
T	91	6	31	0	0	140	0	268
U	0	0	0	0	0	54	0	54
TOTAL	1445	725	951	546	332	2672	1741	8412
CONDITION								
STANDARD	945	433	682	393	301	2183	1439	6376
MINOR	224	146	94	25	4	189	11	693
MODERATE	199	102	159	107	14	296	262	1139
SUBSTANTIAL	46	26	8	8	8	1	13	110
DILAPIDATED	31	18	8	13	5	3	16	94
A: abandoned structure C: cabin/shack D: duplex F: four-plex H: historic L: migrant labor camp (or possible labor camp)				M: mobile home P: triplex R: under rehabilitation S: single family T: apartments U: under construction				

Source: Housing Condition Report, Napa County, 1989, Rural California Housing Corporation

FIGURE 30: TYPICAL OBSOLESCENCE OF WOOD FRAME SINGLE FAMILY DWELLING



Source: Housing Element of the City of Monrovia - 1976
and the Department of Housing and Urban Development

THE HOUSING MARKET

This section presents an overview of the housing market as additional background for defining the County's housing problem and as a foundation for the development of housing objectives and programs for the County.

In order to identify housing problems and develop housing objectives and programs, an understanding of how people use and view housing as part of their lives is helpful. The answers to who buys and rents what housing where in Napa County, particularly as the answers relate to lower and middle income households, are important as a guide to the County and its governmental units in developing the means to foster housing choices.

The "who" question refers to housing consumers which can be grouped into renters and owners, income categories, race or ethnic origin, age, etc. The "what" question refers to the condition, quality and features of housing used by consumers. Neighborhood characteristics are also part of the "what" question. The "where" question refers to the relationship between housing location of employment, shopping and other services.

HOUSING AS A COMMODITY

Housing is much more than a shelter. It is a bundle of services of which shelter is but one part. The physical unit is a grouping of rooms with certain features such as a two-car garage or air conditioning all on a specific sized plot of land. The physical unit is also in a particular state of repair, ranging from brand new to old and dilapidated.

Another characteristic of the bundle of services is the neighborhood environment in which housing exists. This includes social aspects, such as neighborhood organizations and social activity and physical aspects, including density, traffic congestion and natural amenities.

A third part of the bundle includes public services and utilities, such as schools, police protection, street maintenance, etc. and the quality of these services. Fourth, location, in terms of instance to work place, shopping, recreation, etc., is a part of the bundle.

For owners and potential owners, financial security of the owner's investment is an important component of housing. Ownership provides the benefit of equity investment and, hopefully, accumulation but gives up a degree of mobility. Ownership also provides control of the property. Renting provides greater mobility but no equity increase and little or no control over rental increases, maintenance or occupancy regulations.

PRICE OF HOUSING

The pricing of housing is the result of a complex set of variables that cumulatively add up to its cost. Figure 31 presents cost figures for a standard quality single-family home in the Bay Area.

**FIGURE 31: COST OF STANDARD QUALITY SINGLE FAMILY RESIDENCE
SAN FRANCISCO BAY AREA - JANUARY, 1986**

			\$ Cost As of 1/1/81	% of Total Dollars	\$ Cost Per S.F.
PRELIMINARY AND GENERAL CONDITIONS	1.0	<u>1.</u> Permits, plan checking, temporary power, water, portable toilet, debris box	1,385	1.7	.88
		<u>2.</u> Final clean-up (allowance)	300	.5	.21
SITE	2.0	<u>1.</u> Site preparation and excavation	990	1.2	.63
		<u>2.</u> Flatwork (drive-way, patio, walks)	1,921	2.4	1.22
CONCRETE	3.0	<u>1.</u> Foundations, slabs, piers	2,960	3.7	1.89
MASONRY	4.0	<u>1.</u> Brick hearth and face veneer at fireplace	550	.7	.35
METAL	5.0	<u>1.</u> Rough hardware	272	.3	.17
		<u>2.</u> Finish hardware (allowances)	200	.2	.13
WOOD CABINETRY	6.0	<u>1.</u> Rough lumber	5,706	7.0	3.63
		<u>2.</u> Finish lumber	390	.5	.25
		<u>3.</u> Rough carpenter labor	6,836	8.5	4.35
		<u>4.</u> Finish carpenter labor	1,367	1.7	.87
		<u>5.</u> Countertops (cultured marble and laminated plastic)	1,204	1.5	.77
		<u>6.</u> Cabinets	2,987	3.7	1.90

			\$ Cost As of 1/1/81	% of Total Dollars	\$ Cost Per S.F.
THERMAL AND MOISTURE PROTECTION	7.0	<u>1.</u> Insulation, weather stripping, thresholds	1,842	2.3	1.17
		<u>2.</u> Roofing (medium shakes)	1,842	2.3	1.17
DOORS	8.0	<u>1.</u> Doors	1,667	2.1	1.06
		<u>2.</u> Garage door	319	.4	.20
		<u>3.</u> Aluminum sliding doors, all with screens	983	1.2	.63
FINISHES	9.0	<u>1.</u> Stucco	5,188	6.5	3.30
		<u>2.</u> Gypsum wall board, ceiling acoustical spray	3,533	4.4	2.25
		<u>3.</u> Resilient flooring (allowance)	1,600	2.0	1.02
		<u>4.</u> Carpeting (allowance)	1,950	2.4	1.24
		<u>5.</u> Painting	2,929	3.6	1.87
SPECIAL TIES	10.0	<u>1.</u> Shower and tub enclosures	365	.5	.23
		<u>2.</u> Prefabricated fireplace	752	.9	.48
		<u>3.</u> Bath accessories (allowance)	525	.7	.33
APPLIANCES	11.0	<u>1.</u> Built-ins (allowance)	1,250	1.6	.80
MECHANICAL	12.0	<u>1.</u> Heating and sheetmetal	3,940	49	2.51
		<u>2.</u> Plumbing, including sewer connection	5,835	7.3	3.72
ELECTRICAL	13.0	<u>1.</u> Wiring	2,541	3.2	1.62
		<u>2.</u> Fixtures (allowance)	950	1.2	.61
SUB-TOTAL					
	A.	Insurance: Workers' Comp., Social Security, Unemployment	2,215	2.8	1.41
	B.	Overhead and profit 15%	10,143	12.6	6.47

			\$ Cost As of 1/1/81	% of Total Dollars	\$ Cost Per S.F.
	C.	Plans and Specifications	333	.4	.21
TOTAL CONSTRUCTION COST					
SUMMARY	Area		S.F. Cost	Total	
House	1570 S.F.		\$44.68	\$70,152	
Garage	446 S.F.		\$18.47	\$ 8,238	
Patios - Driveway- Walks	837 S.F.		\$ 2.30	\$ 1,238	
TOTAL CONSTRUCTION COST				\$80,311	

Source: Bank of America, January, 1986

In Napa Figure 32 quantifies the cost of new housing in the unincorporated area and, for comparison, in the City of Napa. In the unincorporated area the cost of a single family home (excluding land cost) reach an average high of \$166,167 in 1984. In 1985 the average cost dropped for two reasons to \$118,945, the lowest in over 5 years. First, 49 or 24% of the units built were 2nd units. Second, 46 or 22% of the units built were mobile homes. The 1983 data also indicate that multiple family housing, at \$31,100 per unit, is far cheaper than single family construction. Consequently, three types of lower cost housing were constructed between 1980 and 1986 in the form of second units, mobile homes and apartments.

**FIGURE 32: AVERAGE COST OF NEW HOUSING (NOT INCLUDING LAND COST)
BASED UPON BUILDING PERMITS, CITY OF NAPA, COUNTY OF NAPA
1966-1985**

Average Cost Per Unit (Number of Units)								
	Single Family				Multiple Family			
	Unincorporated		City of Napa		Unincorporated		City of Napa	
1966	20,794	(198)	N/A		10,102	(68)	N/A	
1971	32,704	(121)	20,458	(341)	21,581	(117)	10,010	(715)
1975	58,526	(131)	32,262	(342)	26,733	(6)	15,602	(66)
1981	150,167	(106)	74,102	(61)	0	(0)	56,602	(66)
1982	121,406	(114)	N/A	(139)	N/A	(2)	31,375	(252)
1983	139,631	(101)	89,427	(359)	31,100	(36)	27,551	(270)
1984	166,167	(133)	70,186	(223)	N/A	(3)	43,096	(155)
1985	118,945	(208)	106,269	(149)	N/A	(2)	N/A	(64)

Source: City of Napa Building Department and County of Napa Building Division of Conservation, Development and Planning Department

Another dimension of housing costs is the change in construction earnings and construction materials cost. Figures 33 and 34 present these figures.

Existing dwelling unit prices appreciated at approximately 10% per year in the early 1970's. In the late 1970's, some homes appreciated 20% to 30% or more in a single year. If this rate had continued, a home would have doubled in value in just over three years. Incomes, in general, have not increased at that rate. Many homeowners today could not afford to purchase the home they presently own if they were attempting to purchase it as their first home without the benefit of equity from a previously owned home.

Two recent changes to financing home purchases have provided more flexibility for buyers and a greater degree of interest protection for lenders. In addition to traditional 30 year fixed rate mortgages, many lenders offer 15 year fixed mortgages. While increasing the monthly payment as compared to the same rate 30 year mortgage, the total interest charges are greatly reduced for the buyer. The other change is the availability of adjustable rate mortgages where the interest rate fluctuates up or down as the other financial market rate changes. Initial rates are usually 2 to 2-1/2 percentage points lower than comparable fixed rate mortgages, but the buyer is subject to up to a maximum interest rate change over the life of the mortgage of 4 or 5 points.

The purchase of a home require a cash down payment and a mortgage loan. The cost of the loan is variable as to interest rates, which fluctuate with market demand, and as to the ratio of the loan to the value of the property. A new single-family unit backed by FHA or VA insurance has a high loan to value ratio, meaning a lower down payment. For older homes, lenders may increase the down payment and/or shorten the term. Table 35 shows how higher interest rates can affect housing payments.

Other parts of monthly housing cost for homeowners are taxes, utilities, maintenance, transportation and insurance. The transportation costs are often overlooked as a component of housing cost. The cost of travel from home to work, shopping, school, etc., can be a significant part of the total housing cost when the distance is great.

In mid-1986 Congress was considering a major overhaul of the nation's tax laws. Although the House and Senate versions had differences as to real estate applicability, most observers agreed that heavy federal tax incentives for real estate investment would, as a minimum, be sharply curtailed. This most likely translates into: less residential construction except for single family housing; higher rents for apartments and higher resale values for apartments; and stable or declining mortgage rates. Single family housing may become more affordable relative to renting, and higher production of single family homes and condominiums could attract a higher percentage of home buyers.

FIGURE 33: HOURLY CONSTRUCTION WAGES, 1982-1986

		1986		
	U.S. 1982	U.S. 1986	S.F.* Factor	Total
Bricklayer	\$16.56	\$20.50	126 %	\$25.83
Building Laborer	13.01	15.55	130	20.22
Carpenter	16.37	20.00	129	25.80
Electrician	18.42	22.40	141	31.58
Painter	15.85	19.25	148	28.49
Plasterer	16.77	19.90	143	28.46
Plumber	18.46	22.55	160	36.08
*Union wage factor for San Francisco area.				

Source: National Construction Estimator, 1982; Building Construction Cost Data, R.S. Means Co., 1986

**FIGURE 34: COST OF CONSTRUCTION MATERIALS, 1970-1984
(INDEXED TO 1967=100)**

	All Materials	Hardwood Lumber	Prepared Paint	Plumbing Fixtures	Asphalt Roofing	Concrete Ingredients
1970	112.5	114.6	112.4	111.2	102.7	112.6
1975	174.0	160.3	106.9	162.3	225.9	172.3
1976	187.7	176.0	174.4	174.1	238.3	186.7
1977	204.9	200.3	182.4	186.6	253.0	199.0
1978	228.3	235.8	192.3	199.1	292.0	217.7
1979	251.4	260.0	204.3	217.1	324.6	244.0
1981	283.0	255.2	249.8	267.5	407.5	296.3
1984	306.4	319.7	272.5	302.7	399.5	325.7

Source: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the U.S., December 1985

**FIGURE 35: MONTHLY MORTGAGE PAYMENTS (PRINCIPAL AND INTEREST),
30 YEAR AMORTIZATION**

Price of Home	\$50,000		\$75,000		\$100,000	
Percentage Down	10%	20%	10%	20%	10%	20%
Interest Rate						
9%	362	321	543	483	724	644
10%	395	351	592	526	790	702
11%	429	381	643	571	857	762
12%	463	411	689	617	926	885
13%	498	442	741	664	996	885
14%	533	474	782	711	1067	948
15%	569	506	853	759	1138	1012
16%	605	538	908	807	1210	1056
17%	642	570	962	855	1283	1141
18%	678	603	1017	904	1356	1202

Source: John Whitridge

In the case of renter-occupied housing, costs associated with ownership are passed on to renters but without the benefits of equity buildup, control and income tax deductions. On the other hand renters assume none of the risks of ownership and without the benefits to landlords, rents would likely be higher. A landlord must make payments on a mortgage, taxes, utilities, maintenance and insurance before he derives any profit. In some cases profit may be in terms of equity gain (rise in value of property) instead of profit from rents.

HOUSING DYNAMICS

The traditional framework for housing dynamics is commonly known as filtering. Housing originally built by and for upper income households gradually "filters down" over the years to middle income and then lower income households. With downward filtering comes less maintenance, decreased public services, difficulty in arranging mortgage loans, and increased renting. But not all filtering is "downward". Filtering "upward" can occur when older, lower income areas

become desirable for higher income households. Some neighborhoods never filter at all.

Some of the forces that contribute to filtering are incompatible land use; discrimination by sex, age, race and ethnic origin; new housing production and rising personal incomes; aging of housing; and institutional factors such as lending practices.

Filtering is primarily an urban housing process. In Napa County downward filtering is evident in the County's cities in older neighborhoods. The process is not all negative in that it produces the major supply of lower cost housing. In the City of Napa upward filtering is discernable in the "Old Town" neighborhoods where historic and architecturally significant residences are being purchased and rehabilitated. On a more diffuse basis downward filtering is occurring in the unincorporated areas of the County due to the aging of the housing stock. In 1980 some 2,280 housing structures were built 40 or more years ago. Most of the lower cost housing is most likely from this older housing stock.

In some communities the conversion of rental apartment structures to condominium ownership can result in the loss of rental units. One of the problems is the displacement of low and moderate income tenants of the converted apartment buildings. Many tenants cannot afford the down payment or the increased monthly payments required to purchase the converted unit. Lower income and elderly persons living on fixed incomes derive little benefit from the tax write-off advantages of ownership if they can afford to purchase the unit. A sizeable number of conversions occurring in one area will reduce the number of rental units available and likely lead to increased rents in the remaining units.

Condominium conversion is not a problem now in Napa County due to the few number of apartments. The County has no mechanism for condominium conversion, nor have any applications requesting condominium conversion been made. Should an apartment owner request conversion to condominium, the regulation of condominium conversion should be considered. Regulations would allow conversions only when the rental vacancy rate is high (above a certain factor), assure existing tenants the first opportunity to purchase their unit, designate a percentage of tenants that would be able to afford to purchase their units, and require the relocation of displaced tenants. In addition, all forms of conversion should be treated in the same way regardless of the apartment and stock cooperatives. Conversions initiated by non-profit groups which allow the existing tenants to purchase their units and remain there should be encouraged.

HOUSING NEEDS OF LOWER AND MIDDLE INCOME HOUSEHOLDS

Moderate, lower and very low income households are defined by HUD according to the following table which is based upon 80 to 125 percent; 50 to 80 percent; and less than 50 percent of the median income for Napa County, respectively:

FIGURE 36: HOUSEHOLD INCOME LIMITS, NAPA COUNTY, 1990

Persons Per Households	Median Income Household Limit	Moderate Income Household Limit	Lower Income Household Limit	Very Low Income Limit
1	\$27,250	\$32,700	\$21,750	\$13,600
2	31,100	37,350	24,900	15,550
3	35,000	42,000	28,000	17,500
4	38,900	46,700	31,100	19,450
5	41,350	49,600	33,050	21,000
6	43,750	52,500	35,000	22,550
7	46,200	55,450	36,950	24,100
8	48,650	58,350	38,900	25,650
Area Median: 38,900				

Source: U.S. Department of Housing and Urban Development

In that the U.S. Census data are not aggregated by the income limits set forth above, it is not possible to accurately count the number of moderate, lower and very low income households for each household size. A meaningful relationship is established between income and cost of housing for both renters and owners in Figures 37 and 38. The figures indicate those households overpaying for housing by paying more than 35% of income for rent or ownership. The 35% threshold is more realistic in the 1980's than the old standard of 25% prior to this decade. The data show that 536 owner households and 615 renter households in the lower income category (80% of median income or below assuming 2 person households) are overpaying for housing.

Using three indexes of inadequate housing (overcrowding, lack of central heat and incomplete kitchen facilities), Figure 39 indicated the number of housing units in the unincorporated areas in each category.

The bottom line of the relationship between income and housing cost is affordability. An often used comparison is home price and annual income needed

to qualify for standard financing. In December, 1989, the median home price was 16% higher than 1988. Only 24% of the areas households qualified in 1988 and 19% in 1989. In the San Francisco area the median home price was \$260,592 in 1989, 22.5% higher than in 1988. Households qualifying for such housing equaled 20% in 1988 compared to only 11% in 1989.

According to the City of Napa's Housing Element the 1985 Napa City median home price was \$102,650 (certainly far less than what the median was in the unincorporated area were it known). Qualifying annual income was \$37,440. With HUD's 1985 median income for Napa of \$31,500, the "affordability gap" was \$5,940 of annual income.

The City of Napa's November 1989 Futures Report indicates that the 1988 City median home price was \$140,900, affordable to 19.6% of Napa households.

FIGURE 37: OWNER-OCCUPIED HOUSING UNITS BY HOUSEHOLD INCOME, 1979

	Total Unincorp- orated County	American Canyon	Angwin	Deer Park	Unincorp- orated Remainder
Less than \$5,000 - Less than 20 %	16	--	--	--	16
20 to 24 %	14	--	--	--	14
25 to 34 %	43	5	5	--	33
35 % or more	167	27	11	6	123
\$5,000 to \$9,000 - Less than 20 %	205	9	5	--	191
20 to 24 %	47	9	--	--	38
25 to 34 %	56	7	--	6	43
35 % or more	136	40	6	--	90
\$10,000 to \$14,999 - Less than 20 %	417	63	22	27	305
20 to 24 %	45	5	0	0	40
25 to 34 %	79	20	7	5	47
35 % or more	119	20	--	25	74
\$15,000 to \$19,999 - Less than 205	531	114	58	30	329
20 to 24 %	49	12	0	5	32
25 to 34 %	95	12	0	0	83
35 % or more	144	10	6	7	121
\$20,000 or More - Less than 205	2,792	498	105	129	2,060
20 to 24 %	396	51	18	20	307
25 to 34 %	398	73	35	9	281
35 % or more	204	5	0	0	199

Source: 1980 U.S. Census

FIGURE 38: RENTER-OCCUPIED HOUSING UNITS BY HOUSEHOLD INCOME, 1979

	Total Unincorp- orated County	American Canyon	Angwin	Deer Park	Unincorp- orated Remainder
Less than \$5,000 - Less than 20%	0	--	--	--	0
20 to 24%	8	--	--	--	8
25 to 34%	18	--	13	--	5
35% or more	254	5	38	4	207
\$5,000 to \$9,000 - Less than 20%	56	--	20	13	13
20 to 24%	34	5	0	10	19
25 to 34%	170	11	38	12	109
35% or more	215	54	4	17	140
\$10,000 to \$14,999 - Less than 20%	111	--	14	15	82
20 to 24%	63	--	16	7	40
25 to 34%	132	--	10	22	100
35% or more	136	25	14	--	97
\$15,000 to \$19,999 - Less than 20%	188	10	48	6	124
20 to 24%	123	0	20	0	103
25 to 34%	60	6	6	0	48
35% or more	10	0	0	0	10
\$20,000 or More - Less than 20%	563	80	64	49	370
20 to 24%	108	7	13	8	80
25 to 34%	79	0	14	0	65
35% or more	0	0	0	0	0

Source: 1980 U.S. Census

FIGURE 39: OVERCROWDING; LACKING CENTRAL HEATING; INCOMPLETE KITCHEN FACILITIES; UNINCORPORATED NAPA COUNTY, 1980

	Total Unincorporated County	American Canyon	Angwin	Deer Park	Unincorp- orated Remainder
1.01 Persons Per Room or More	443 (3 %)	85 (4 %)	43 (5 %)	25 (5 %)	290 (3 %)
Lacking Central Heating	2,623 (20 %)	342 (17 %)	94 (12 %)	91 (17 %)	2,096 (24 %)
No Complete Kitchen	162 (1 %)	12 (1 %)	18 (2 %)	0 (0 %)	132 (2 %)

Source: 1980 U.S. Census

A more complete but somewhat outdated analysis is available from HUD. Using 1970 U.S. Census data, HUD cross tabulated income, overcrowding and lack of plumbing facilities to compute tables of inadequate living conditions for renters and owners in three household types. Figures 40 and 41 present HUD's data by various household types for owners and renters, respectively. As expected, the City of Napa had the highest number of renters with inadequate living conditions, 1,990, which represents 61 percent of the total County renters with inadequate housing conditions. On the other hand, the unincorporated area of the County had the highest number of owner occupied units with inadequate living conditions, 321, or 48 percent of the total County homeowners with inadequate conditions. The housing assistance needs of lower and moderate income households are better indicated in the HUD analysis due to its more comprehensive data base, in spite of the older data as it includes indices of over-crowding and lack of plumbing as well as incomes.

**FIGURE 40: INADEQUATE* LIVING CONDITIONS, OWNER-OCCUPIED UNITS
NAPA COUNTY, 1970**

	County Total	City of Napa	Unincor- porated	Balance of County
Elderly				
1 Person	154	59	78	17
2 Persons	114	48	53	13
	268	107	131	30
1-4 Person Households				
1 Person	34	9	21	4
2 Persons	15	6	7	2
3-4 Persons	69	34	28	7
	118	49	56	13
5+ Person Households				
5 Persons	33	15	14	4
6+ Persons	241	95	120	26
	274	110	134	30
TOTAL	660	266	321	73
*overpaying, overcrowding and/or lack of plumbing				

Source: Department of Housing and Urban Development 1970 U.S. Census

**FIGURE 41: INADEQUATE* LIVING CONDITIONS, RENTER-OCCUPIED UNITS
NAPA COUNTY, 1970**

	County Total	City of Napa	Unincorp- orated	Balance of County
Elderly				
1 Person	764	421	259	84
2 Persons	302	190	79	33
	1,066	611	338	117
1-4 Person Households				
1 Person	592	382	145	65
2 Persons	542	370	112	60
3-4 Persons	645	416	158	71
	1,779	1,168	415	196
5+ Person Households				
5 Persons	148	78	54	16
6+ Persons	267	133	104	30
	415	211	158	46
TOTAL	3,260	1,990	911	359
*overpaying, overcrowding and/or lack of plumbing				

Source: Department of Housing and Urban Development 1970 U.S. Census

The overall need of a community's population include service needs and job needs as well as shelter needs. The types of jobs available in the community or within commuting distance of the community determine the levels of income available. Fluctuations in employment opportunities in different sectors of the job market directly affect the ability of households to pay for housing.

The social factors of households - age, sex, marital status, number of children, racial or ethnic background and total numbers of persons - also affect the ability of households to obtain adequate housing. For example there are significantly different shelter needs for each of the following types of households:

- An elderly couple on fixed income living in a home "free and clear" of a mortgage.
- An elderly widow on a fixed income seeking a low-rent unit.
- A middle aged white couple with four teenage children, unemployed husband and no savings.
- A middle aged chicano couple with three children, seasonal employment for the husband, grandparents living with the family.
- Recently divorced female with two young children, unemployed, mortgage payments beyond AFDC limits.

It becomes clear that the individual shelter needs of families vary to such a degree that each household unit is virtually unique when all of the physical, neighborhood, service and locational characteristics are included with the income, social and employment factors. Within this complex framework of an infinite variety of households seeking adequate shelter are various other key individuals including builders, developers, realtors, lenders, investors, landlords, property managers, mortgage brokers, elected governmental officials and governmental staff persons.

Special Needs

Several specific groups within Napa County's population can be identified as having special housing needs. These are handicapped, elderly, minorities, large families, female headed households, homeless and farmworkers. Using 1980 Census data, the estimate of 1980 housing assistance needs for special groups is as follows:

FIGURE 42: SPECIAL HOUSING NEEDS, UNINCORPORATED NAPA COUNTY, 1980

	Unincorporated County	American Canyon	Angwin	Deer Park	Unincorporated Remainder
Female-Headed Household Below Poverty	159	31	13	0	115
Persons 65 years and over Below Poverty	301	64	9	7	221
Persons of Spanish Origin Below Poverty	276	24	55	0	197
Persons of Other Minority Below Poverty	147	57	19	0	71
Households 5 Persons or More	1,448	286	91	43	1,028
Public Transportation Disability, Age 16-64	392	149	20	24	199
Age 65 +	508	91	64	45	308
Work Disability In Labor Force	847	156	85	45	561
Not in Labor Force	1,288	329	53	51	855

Source: 1980 U.S. Census

Of the 4,587 elderly persons in the unincorporated County in 1980, 301 or nearly 7% were officially below the poverty line. Often on fixed income as well as needing smaller, specially designed housing units, the lower income elderly face difficult housing problems. Handicapped persons, who may be physically disabled, developmentally disabled or mentally disordered, also have special housing needs. There are two U.S. Census indicators of handicapped persons: those with work disability and those with a public transportation disability. In the unincorporated area 847 persons with a work disability are in the labor force while 1,288 persons with a work disability are not in the work force, a total of 2,135 persons with work disability. As far as public transportation disability, there are a total of 900 persons with such disability aged 16 or more. Of these, 508 or 56% are elderly aged 65 or more. County and State agencies assisting the developmentally disabled or mentally disordered must address a host of concerns of which an adequate residential setting is but one. A particular issue in Napa County is the long term trend of placing patients leaving Napa State Hospital into the local community.

Other special housing need groups are female-headed households, minorities, large families and the homeless. The 159 female-headed households below the poverty line in the unincorporated area, which represents 19% of the total 819 female-headed households in the unincorporated area, have the disadvantage of no other bread winner and 72% of their households including children. Minorities face discriminatory housing practices as well as economic disadvantages. Larger families need housing with several bedrooms to avoid overcrowding. Figure 42A below indicates the number of bedrooms in dwelling units in the unincorporated areas. With 1,448 households of 5 persons or more and a supply of 5,363 three bedroom units and 1,656 four bedroom units, there appears to be an adequate supply. Whether the larger units are affordable to all large families needing such units cannot be determined. Census data does indicate that few of the 4 and 5 bedroom units are rentals which would indicate that lower income, large households cannot afford larger homes for sale.

FIGURE 42A: DWELLING UNITS BY NUMBER OF BEDROOMS

Number of Bedrooms	Total Unincorporated County	American Canyon	Angwin	Deer Park	Unincorporated Remainder
0	212	0	10	10	192
1	1,584	146	174	106	1,158
2	4,098	554	252	168	3,124
3	5,363	980	271	180	3,932
4	1,656	315	91	97	1,153
5+	331	20	12	6	293

Source: 1980 U.S. Census

A more recently acknowledged special housing need group is the homeless, those who need emergency and temporary housing. Two local non-profit agencies, Napa Valley Shelter System and Napa Emergency Womans Service (NEWS), provide short term help in this area. No hard data on the need is available, but Samaritan House has served 714 persons between September, 1983 and April, 1986, while turning away several hundred for lack of space or other criteria. NEWS has met the emergency needs of 96 women and children between October, 1984, and September, 1985, when the shelter closed temporarily due to a shortage of funds. These agencies estimate the annual need of the homeless to be in the range of 350 to 450 persons.

Farmworkers

There is a general lack of reliable information on farmworker housing needs; Census data is of little help. The State Employment Development Department (EDD) provides a February 1989 estimate which indicate the following:

- a) The total agricultural employment increased between 1970 and 1988 at an annual rate of approximately .3%. This includes "hired domestics" (farmworkers) and "farmers and unpaid family".
- b) Of the estimated 2,900 total employed in agriculture in 1988, 2,450 (86%) were farmworkers, and of the farmworkers, 670 (23%) were seasonal workers. Approximately 1,780 farmworkers were year-round workers.
- c) The number for seasonal farmworkers has remained stable at an average between about 500-600 since 1965. The farmworkers growth has been in year-round employment.

The total number of 1985 farmworker housing need for the unincorporated area of the County (600 units) was derived from ABAG's total County figure of 2,074 based on proportion of persons of Spanish origin residing in each jurisdiction.

The ABAG report estimates 2,730 farmworkers in all of Napa County in 1980 and 3,630 in 1985, an increase of 900 or 33%. ABAG was not able to desegregate the figures to jurisdictions within the County. Assuming that farmworker households live in areas of Napa County in the same proportion that people of Spanish origin reside per 1980 Census data, the distribution of the 1985 farmworker household housing need of 2,074 by place of residence would be:

Calistoga	168
Napa City	1,000
St. Helena	190
Yountville	50
Unincorporated	666

Total	2,074

In terms of housing need, ABAG's report states:

"Because farmworkers are of low-income and their employment status is often tenuous, they are often unable to compete for housing on the open market. In addition, because most farmworkers share a culture and language that

is often different from the communities in which they work, they are often discriminated against in the housing market. Again, as is the case for low-income families in urban areas, farmworker families have difficulty securing adequate shelter."

Given the limited data at hand, it is safe to say that there is an existing housing need for farmworkers.

Furthermore, the need is a Countywide need that must involve all local government jurisdictions. Finally, it can be assumed from limited data sources that nearly all farmworker households are low income and have a significantly higher labor force participation rate than other forms of employment.

LAND SUITABLE FOR RESIDENTIAL DEVELOPMENT

Napa County has ample land suitable for residential development due to:

- A. An inventory of about 4000 buildable lots (see Figure 9, page 16).
- B. A building lot creation rate which exceeds the building lot consumption rate (see Figure 9, page 16).
- C. Previously approved residential development for which construction is solely contingent upon market conditions (see Figures 43 and 44 and page 123).
- D. Ample land planned and zoned for urban residential development in areas served/serviceable with water, sewer and urban services (see Figure 45, page 118).

The American Canyon area is designated in the County General Plan as urban in nature and suitable for single family subdivisions. New subdivisions in this area should include units to meet the needs of low and moderate income households. American Canyon has services with excess capacity. Development is desirable to help adequately support the existing services infrastructure (see Figure 46). Other urban unincorporated areas such as Deer Park and Angwin (outside of Pacific Union College) lack adequate services to accommodate any significant development.

In the American Canyon urbanized areas there are several sites that have approved residential projects that can reasonably be expected to develop over the next five years. Additional sites have potential for housing development beyond 1990. Figure 43 below lists the 5 year level of approval projects (also see Figure 44).

FIGURE 43: APPROVED RESIDENTIAL DEVELOPMENTS, AMERICAN CANYON

Project	Construction Permitted 1986-1990
Napa Meadows ¹	434 D.U.
Canyon Creek ²	180 D.U.
Brookfield (aka World Marine)	118 D.U.
Napa Glen ^{1 3} (aka Victoria Faire)	326 D.U.
TOTAL	1,058 D.U.
¹ Phasing determined by approved development agreements. ² Referred to on page 139 as Napa Estates Mobile Home Park. ³ Exempted from Growth Management System pursuant to Case 40003, Superior Court of California, County of Napa.	

Source: CDPD

Figure 44 indicates the areas in American Canyon proposed for residential development through or past 1990. Figure 45 indicates existing zoning in American Canyon; the RS zoning allows 5 D.U./acre, PD zoning allows mixed uses including mobile homes and multiple units at 16 D.U./acre and densities to 20 D.U./acre if a 25% low income bonus is added. The American Canyon Zoning (as shown) was deemed consistent with the Napa County General Plan in 1985.

**FIGURE 44: RESIDENTIAL DEVELOPMENT EXPECTED IN
AMERICAN CANYON BY 1995**

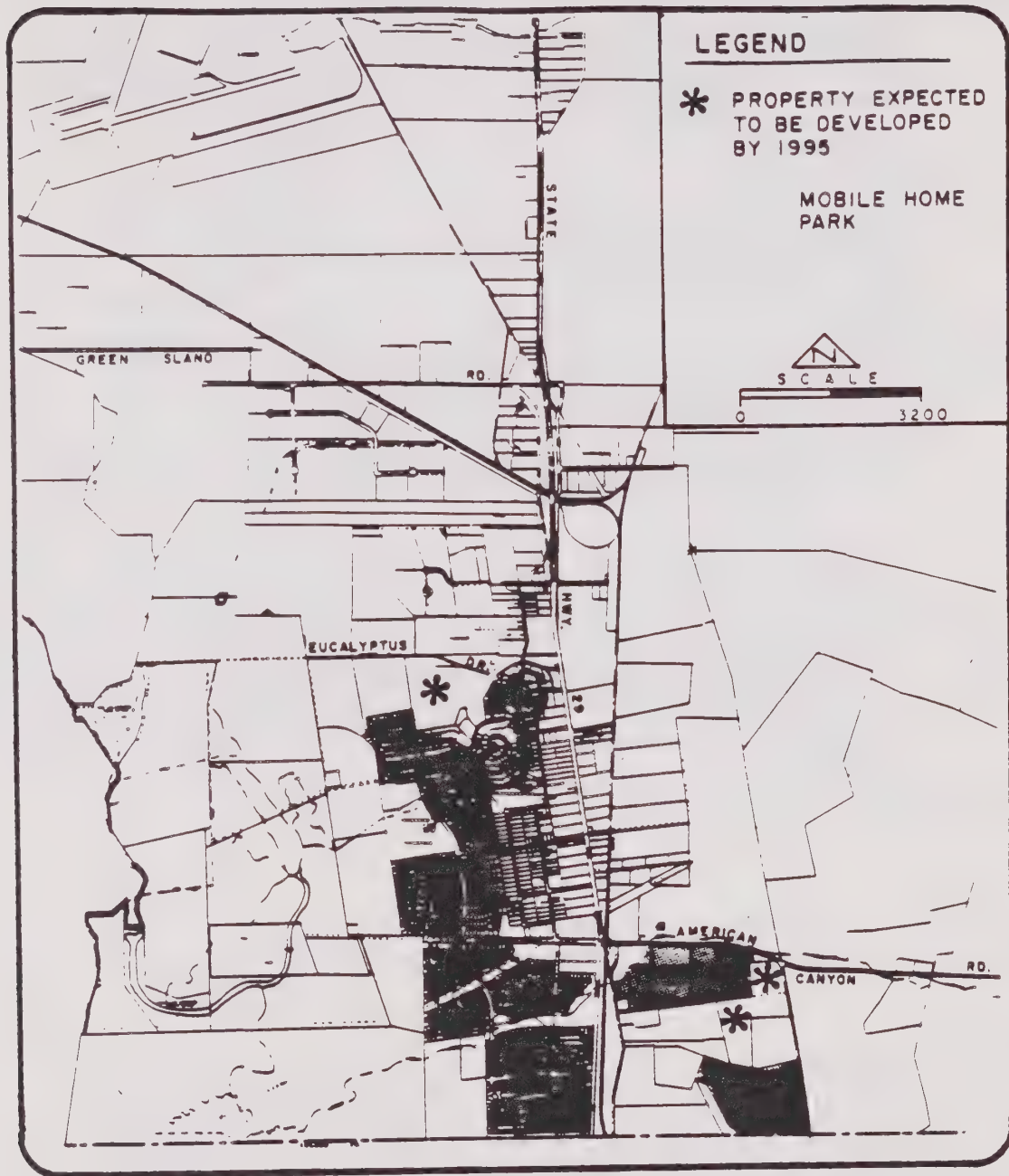


FIGURE 45: EXISTING ZONING IN AMERICAN CANYON, 1990

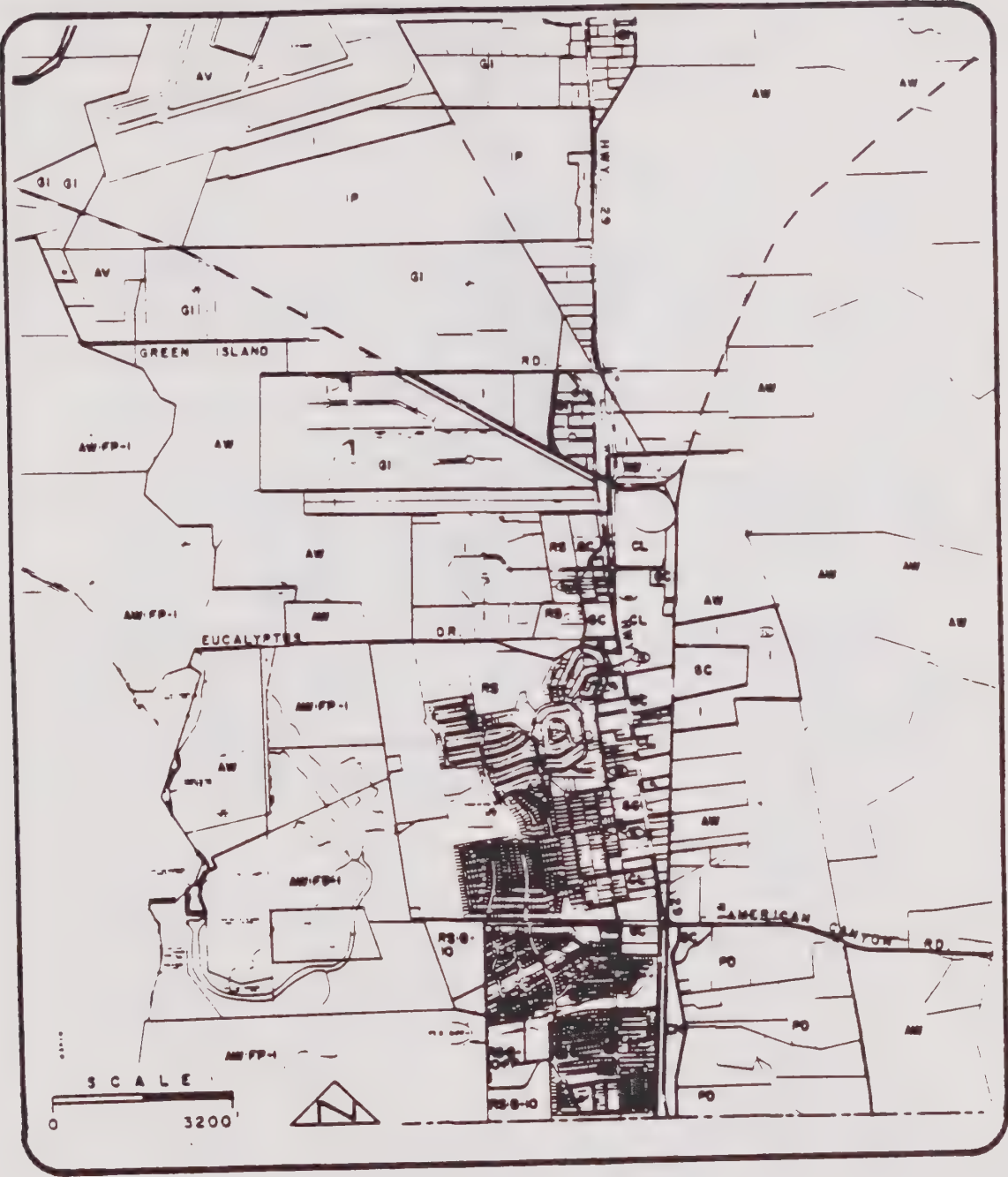
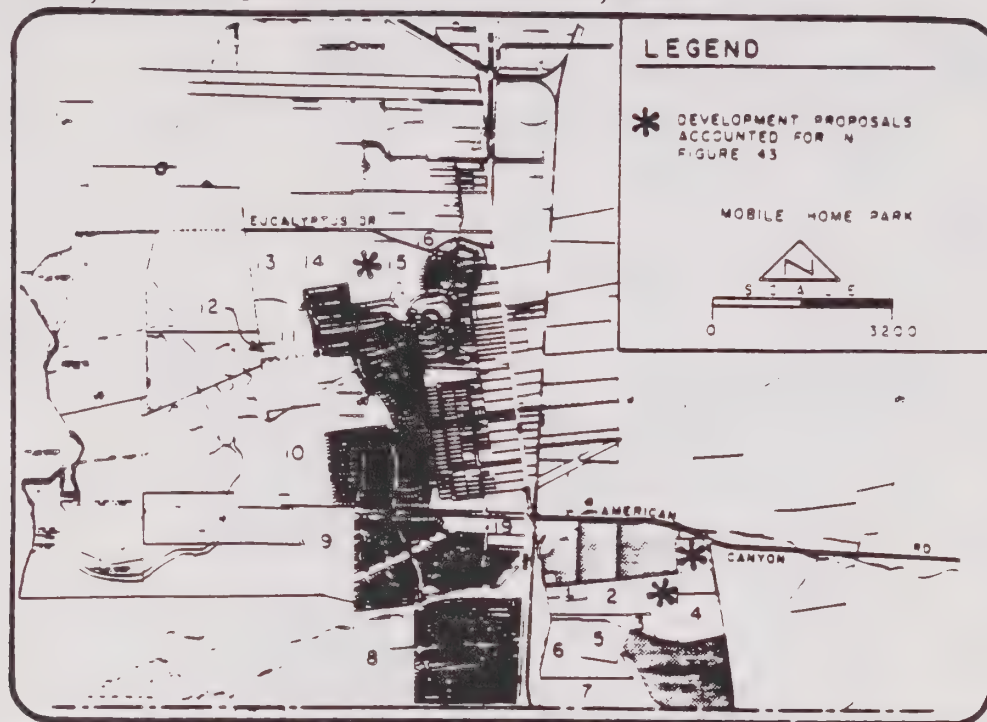


FIGURE 45A: POTENTIAL RESIDENTIAL SITES IN PORTION OF AMERICAN CANYON, BASED ON EXISTING ZONING, 1986



PARCEL	ACREAGE	EXISTING ZONING	POTENTIAL	DENSITY	POTENTIAL RESIDENTIAL SITES	
			Min(DU/AC)	Max(DU/AC)	Minimum	Maximum
1	5.16	PD	6	16	31	83
2	23.2	PD	6	16	139	371
3	10.68	PD	6	16	64	171
4	17.39	PD	6	16	104	278
5	15	PD	6	16	90	240
6	25.83	PD	6	16	155	413
7	29.65	PD	6	16	178	474
8	46	RS:B-10	-	0.1	--	4
9	42.61	RS:B-10	-	0.1	--	4
10	49.37	RS	3	4	148	197
11	35.8	RS	3	4	107	143
12	2	RS	3	4	6	8
13	27.84	RS	3	4	84	111

PARCEL	ACREAGE	EXISTING ZONING	POTENTIAL	DENSITY	POTENTIAL RESIDENTIAL SITES	
			Min(DU/AC)	Max(DU/AC)	Minimum	Maximum
14	24.45	RS	3	4	73	98
15	10	RS	3	4	30	40
16	3	RS	3	4	9	12
17	8	RS	3	4	24	32
18	2.41	RM	6	16	15	39
Sub Total Potential Residential Sites:					1,257	2,718

Other approved residential developments listed in Figure 43 add another 1,058 dwelling sites to the above total.

Note that affordable housing density bonus (Government Code Section 65915) could inflate the number of Potential dwellings on parcels 1-18 by 25% and that other unincorporated areas contain over 4,000 vacant building sites (see Figure 9, page 16).

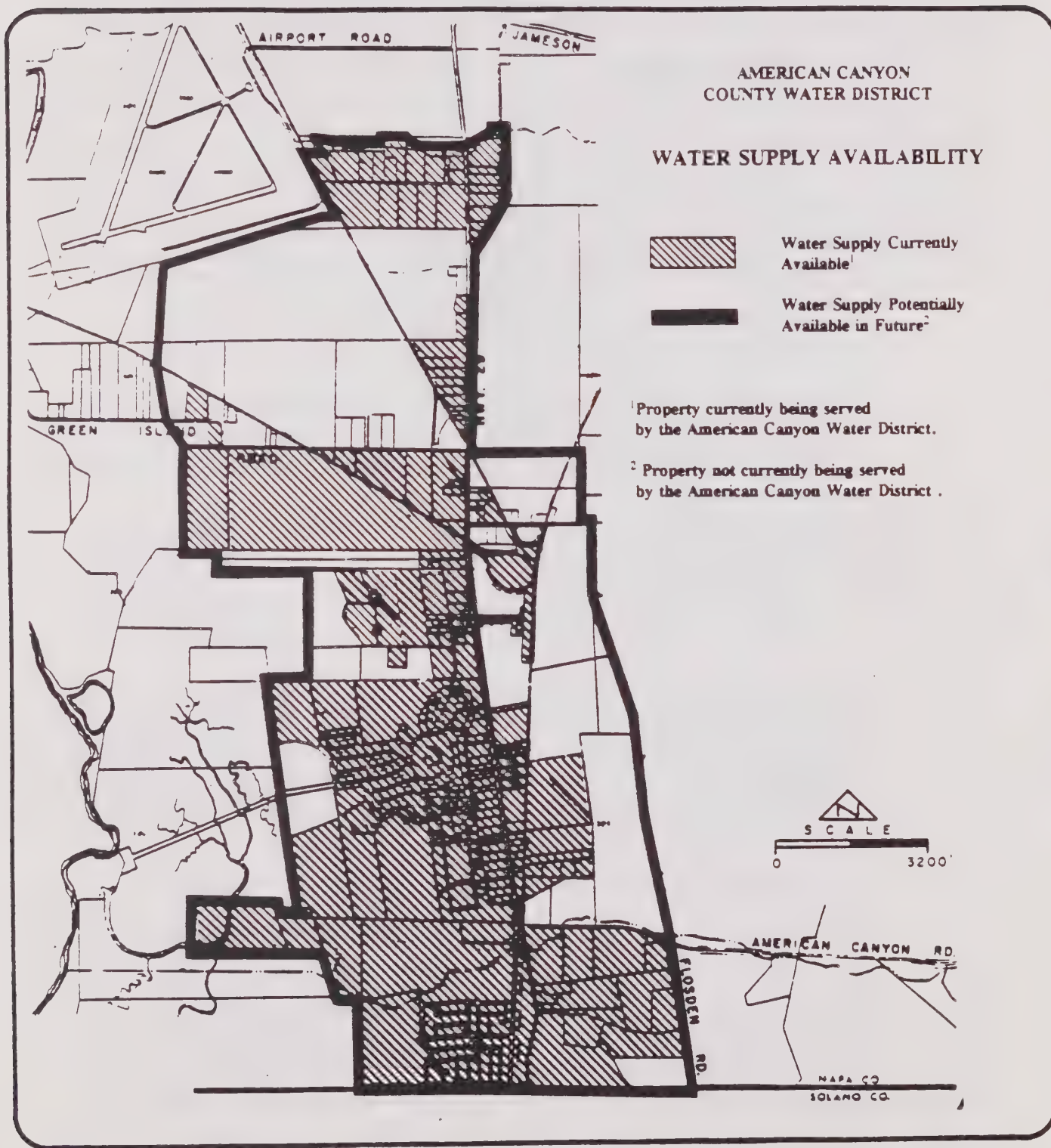
Subtotal potential residential sites:	1250	2823
Other approved residential developments:	1058	1058
Other existing vacant building sites:	<u>4000</u>	<u>4000</u>
Potential building sites	6408	7881

Not counting any density bonuses, the above figures show Napa County has the potential, with existing zoning and utilities (see Figure 46) to accommodate approximately 6500-7500 dwellings. If annual housing demand is estimated to be somewhere between 118 DU (Measure A constraint) and 247 DU (ABAG-determined share of regional housing need; see page 87) Napa's supply of building sites could last 26-67 years, as shown below:

		SUPPLY	
		6408 sites	7881 sites
DEMAND	118 DU/year	54 years	67 years
	247 DU/year	26 years	32 years

The lack of building sites in the unincorporated area is not a constraint on housing.

FIGURE 46: WATER SUPPLY AVAILABILITY IN AMERICAN CANYON



Since 1970, the largest increment of the County's growth has occurred in the City of Napa. Unincorporated land near the City of Napa must be annexed for intensive residential development to occur. In the period of 1970 to 1979 approximately 1,000 existing dwelling units were annexed to the City of Napa. Another 1,209 dwelling units were built on lands annexed to the City.

ABAG HOUSING NEEDS DETERMINATIONS, 1988

Pursuant to law (California Government Code Section 65584) at five-year intervals the State, regional councils of government (in our case ABAG) and local governments must collectively determine each locality's share of regional housing need. These shares must be included in housing element analyses of existing and projected housing need. ABAG's September 1988 "Housing Needs Determinations, San Francisco Bay Region" report contains the housing needs numbers which will be operative through 1995.

ABAG determined Napa County's unincorporated area share of regional housing need for the period 1988-1995 to be 1357 D.U.¹. ABAG disaggregated that share by income category into 529 D.U. (39%) "above moderate," 285 D.U. (21%) "moderate," 231 (17%) "low" and 312 (23%) "very low".² Figures 47 and 49 show what proportion of those shares remain for 1988-1995. (See also page 87.)

FIGURE 47: LOCAL SHARES OF REGIONAL HOUSING NEEDS. DWELLING UNITS PER YEAR 1988 THROUGH 1995

Jurisdiction	Dwelling Units Per Year
City of Napa	10
Yountville	24
St. Helena	128
Calistoga	70
Unincorporated	193
TOTAL	925

Source: ABAG Housing Needs Determinations, September 1988

¹ ABAG, "Housing Needs Determinations...", September 1988, page 29.

² ABAG, "Housing Needs Determinations...", September 1988, page 48.

GROWTH MANAGEMENT SYSTEM

The Napa County General Plan contains a residential Growth Management System Element (GMS), as required by Slow Growth Initiative Measure A, adopted by voters on November 4, 1980 (see pp. 136-151). Measure A limits new residential building permits in the unincorporated area as a means to limit population growth to an annual rate of either 1% or that of the 9-County San Francisco Bay Area, whichever is less. Between 1986 and 1990 that limit translates to 118 GMS-constrained permits per year (see p. 141), with some exceptions. The GMS, as amended through January 10, 1984 and as affected by Napa County Superior Court Cases 40003 and 43475 exempts the following categories of dwelling units (see p. 139):

a) Second units exempted pursuant to Government Code Section 5852.2.

b) "Grandfathered" developments"

	<u>Approved</u>	<u>Remaining</u>
(1) Napa Meadows	434 D.U.	0
(2) Silverado	280 D.U.	160
(3) Meadowood	7 D.U.	5
(4) Brookfield MHP (also World Marine)	125 D.U.	63
(5) Villa Berryessa MHP	202 D.U.	202
(6) Napa Estates MHP (aka Canyon Creek)	208 D.U.	119
(7) Napa Glen (also Victoria Faire)	326 D.U.	43

Total exempted, not counting second units: 1582 D.U. 592 D.U.

In support of the Growth Management System limitation on annual housing unit construction, the following findings justify the alteration of regional housing opportunities:

1. The unincorporated area of Napa County (addressed in this General Plan) can accommodate its share of regional housing needs (as determined by ABAG pursuant to Gov. Code Sec. 65584). ABAG determined the 1988-1990 unincorporated Napa County share to be 1357 D.U.; the Napa County GMS, as noted above, allows construction of at least 1418 D.U. in the 1988-1995 time period, as follows:

Exempted units (not counting "Second Units")	592 D.U.
Seven year's annual allocations (7 X 118)	826 D.U.
Total	1418 D.U.

2. The specific housing programs and activities being undertaken in this Housing Element are listed here in summary form.
 - A. Voluntary rehabilitation program
 - B. Low income rental assistance program
 - C. Density bonus program for affordable housing
 - D. Modification of planning and engineering standards
 - E. Second accessory units
 - F. Intergovernmental cooperation
3. The Growth Management System will promote the public health, safety and general welfare of Napa County by:
 - A. Reducing the cost of government services
 - B. Preventing the loss of irreplaceable agricultural land
 - C. Reducing traffic congestion
 - D. Preserving open space
 - E. Reducing air pollution
 - F. Preventing general urban sprawl
 - G. Reducing crime and need for expanded police protection
 - H. Reducing fire risk and need for expanded fire protection
 - I. Reducing overcrowding of schools
4. The fiscal and environmental resources available to Napa County include:
 - A. Private sector funds (non-profit and profit)
 - B. Public sector funds (State and Federal housing programs)
 - C. County Planning policies confining urban development to urban areas in cooperation with four cities

D. Availability of vacant residential land in American Canyon

NEW CONSTRUCTION NEEDS

Considering population and household projections, ABAG's Housing Needs Report, Measure A and past trends, the new construction needs for Napa County from 1986 to 1990 are as follows based on an annual housing construction rate of 367 units or 1,833 units total.

FIGURE 48: DWELLING UNIT FORECAST, UNINCORPORATED AREA, 1986-1990

	1985	1986	1987	1988	1989	1990
Housing Units in December of Year	13,960	14,327	14,694	15,061	15,428	15,795

Source: John Witridge

Using the 1980 U.S. Census income data as applied to Figure 48, the annual new construction needs by income categories are as follows:

FIGURE 49: ANNUAL NEW CONSTRUCTION NEEDS BY INCOME GROUPS, UNINCORPORATED AREA OF NAPA COUNTY, 1986-1990

	1986-1990 Annual Need	1986-1990 Total Need
Above Moderate (39%)	143	714
Moderate (21%)	77	385
Low (17%)	62	310
Very Low (23%)	85	424
TOTAL	367	1,833

Source: John Witridge

MARKET CONSTRAINTS

The housing market data on pages 95 to 103 presented an overall discussion of the Napa County housing market. The major factors within the private market system which contribute to the direct sale price or rental cost of new housing include land costs, site improvement costs, construction costs, government costs, sales and profit. Figure 32 indicates the average cost of new homes in the unincorporated area is higher than within the City of Napa; the higher average unincorporated

cost is influenced by the following factors:

1. The creation of small building sites is limited by local policy to existing urban areas.
2. Supply and demand maintain a high price for existing building sites (see Figure 9, page 16); an unincorporated 1 acre "building site" typically costs \$180,000 (less in urbanized locations and more in choice locations).
3. Many building sites are costly to improve with access roads, wells and sewage drain fields; no economies of scale are possible with custom homes on unique sites.
4. Napa County's Growth Management System limitation of 118 D.U./year discourages tract development, eliminating the economies of scale possible with repetitive construction.
5. Significant numbers of large, luxurious homes built in the unincorporated area skew the average price upward.

Financing in recent years has also been a severe market constraint with single-family mortgages going in excess of 15 and 16%. Second mortgages, often used for remodeling and additions, have exceeded 18% interest. Although inflation and interest rates declined in late 1985 and early 1986, the continuance of lower mortgage rates is not assured. Further, interest rates are but one of the cost factors. With the high land and construction costs in Napa County, the actual market constraints are severe and inhibit the production of least cost housing regardless of interest rates. Higher interest rates, of course, do make a difficult housing market that is much more difficult.

GOVERNMENT CONSTRAINTS

Local government has few direct influences on the cost factors. The one direct cost affected by local agencies is fees. Lot improvement costs are indirectly influenced by local standards for streets and other site improvements. Planning densities also indirectly affect housing costs. The potential for using these governmental influences on housing costs to lower costs will be discussed in more detail in the Housing Program section.

In general, there are governmental constraints that local government can control by policies and regulations. Among these are land use and development controls, building codes and their enforcement, site improvements, fees and local processing and permit procedure.

Land Use Controls

The County's land use controls offer limited incentives for new construction of low and moderate income housing. As noted previously, only one sizeable unincorporated area is planned for small lot subdivision-type single-family housing: American Canyon. (Pacific Union College and Villa Berryessa are also shown as Urban; but they are of a much smaller size.) Most of the remaining County areas are planned and zones for low density, 10 to 40 acres per unit. The County's land use policies are firmly based upon the goal of urban development occurring in urban areas, principally within the four cities in the County. Within this framework the County must maximize the opportunities for encouraging least-cost housing - the least expensive, unsubsidized housing the private market can provide - in unincorporated areas designated for residential subdivision and development.

The County's zoning ordinance has several provisions which remove land use constraints. The principal urban type residential districts are single family, multiple family and planned development (PD). The multiple family district permits up to 16 units per acre. The PD district allows both single and multiple family housing as well as mobile home, commercial and recreational uses. Second units are permitted in single family, residential country and agricultural watershed districts.

Building Codes

The County regularly adopts the ICBD recommended building and housing codes.

Site Improvements

The zoning district regulations set forth the basic site improvement requirements which are shown in figure 50. The PD regulations are flexible and can be modified to achieve lower cost housing developments. The other regulations are standard requirements.

FIGURE 50: NAPA COUNTY CODE SCHEDULE OF ZONING DISTRICT REGULATIONS

REGULATIONS								
Zoning Dist- rict	Minimum Lot Area		Minimum Lot Width	Minimum Yard (Feet)			Maximum Main Bldg. Coverage	Maximum Bldg. Height
	(Acs)	(Sq Ft)	(Ft)	Front	Side	Rear		
AP	40	--	--	20	20	20	--	35
AP-E	100	--	--	20	20	20	--	35
AP-I	40	--	--	20	20	20	--	35
AW	40	--	--	20	20	20	--	35
AV	--	--	--	--	--	--	--	--
GC	1 ^F	--	--	10 ^A	5 ^A	--	--	35
CL	1 ^E	--	--	--	--	--	--	35
CN	1	--	--	--	--	--	--	35
MC	-varies-		75	20	20	20	40%	35
I	--	20,000	100	20	20	20	35%	35
GI	-varies-		100	-varies-			35-50% ^D	35
IP	-varies-		125	-varies-		10	35%	35
PD	--	--	--	--	--	--	--	35
RS	--	8,000	60	20	6 ^C	20	50%	35
RD	--	8,000	60	20	6 ^C	20	40%	35
RM	--	8,000 ^B	60	20	6 ^C	20	40%	35
RC	10	--	60	20	20	20	--	35
TP	160	--	--	--	--	--	--	35
FR	160	--	--	--	--	--	--	35
GR	160	--	--	--	--	--	--	--

^A. Five feet shall be added to each side and rear yard for each story above the first story of any building.

^B. Plus 2000 square feet per unit.

^C. Three feet shall be added to each side yard for each story above the first story of any building. Minimum yard on the street side of a corner lot shall be 10 feet.

^D. Up to 50% for certain uses.

^E. 1/2 acre if public water and sewer is available.

^F. 20,000 sq. ft. if public water and sewer is available.

Fees

Napa County's planning fees are shown in Figure 51. For a 50 unit, single family subdivision the total planning and building fees for a 1,500 square foot home, excluding environmental fees, are \$1,178 per unit. In American Canyon where water, sewer and recreation fees are added, the total would be \$6,765 per unit.

Permit Processing

The permit approval process can have an effect on housing costs. Lengthy processing of development applications can add to construction costs. expediting review of developments that will offer lower and moderate income housing could be an incentive. In 1981 the Board of Supervisors appointed a citizens committee charged with improving/expediting the development review process; the committee's recommendations have since been implemented.

FIGURE 51: NAPA COUNTY PLANNING FEES, July 11, 1989

ITEM	FEE (Includes Preliminary Environmental Review Fee)	ESTABLISHED
APPLICATION FEES		
Development Agreement	\$1500	10/25/88
Variance	\$600	10/25/88
Rezoning	\$850	10/25/88
General Plan Amendment	\$750	12/12/78
Parcel Map (Division)	\$800/Map	10/25/88
Certificate of Compliance	\$400 + \$20/lot	4/12/88
Reversion to Acreage Map	\$200 + \$10/lot	12/12/78
Tentative Subdivision Map	\$850/Map	10/25/88
Time Extensions	\$250*	10/25/88
ENVIRONMENTAL REVIEW FEES		
Preliminary Environmental Review (Categorical Exemption or General Rule)	\$ 35**	10/25/88

ITEM	FEE (Includes Preliminary Environmental Review Fee)	ESTABLISHED
Preliminary Environmental Review (Initial Study)	\$120**	2/26/87
EIR Administration & Review	\$3,000	10/25/88
Project Revision	\$650	2/26/87
* Environmental Review Fee Not Applicable or Required ** Environmental Review Fee Included in Application Fee		

The Growth Management System Interim Element, adopted as required by Measure A, sets a 1% growth limitation and creates an incentive for the creation of affordable housing. The system allows the status quo level of development to occur and only puts a ceiling on a growth rate greater than that of the region. The System allows the County to accommodate its share of regional housing need. The Growth Management System reserves 6 residential permits per year for "affordable" housing and the County's Affordable Housing Task Force January 24, 1986 recommendations to foster the use of these permits is incorporated into this Housing Element (see Appendix D). The "affordability" section of the System could be improved and should be reviewed to:

- a) Lower the income criteria for "affordable housing" to produce even less expensive housing while not lowering it so much that no "affordable" housing would get built,
- b) Create assurances that "affordable" units would be occupied by qualified families, and
- c) Produce a mechanism which would assure a permanence to the low cost nature of the "affordable" units over time, whether renter or owner occupied.

Recognizing that even with incentives offered by the County, the private market alone cannot construct low income housing, the use of the Napa Housing Authority to utilize available Federal and State programs is needed. Article 34 of the State Constitution has posed a barrier to County involvement in the past. State legislative clarification of Article 34 has now removed much of the cloud over low-rent housing projects created by litigation in the past.

EXISTING HOUSING PROGRAMS

The County has taken several steps to become involved in housing issues in the unincorporated areas. Foremost the County has made available low income rental assistance in cooperation with the City of Napa Housing Authority which administers programs in the unincorporated areas as well as Upvalley Cities. Prior to 1986 the housing authority set aside 50 low income housing certificates for non-City of Napa residents. An additional 25 units are available for AFDC households as recommended by the County welfare department.

In addition, the County has financially supported two emergency housing programs, the Napa Valley Shelter System and the Napa Emergency Womens Shelter (NEWS), and a tenant/landlord mediation organization, Napa County Rental Information and Mediation Service (NCRIMS). All three programs are administered by non-profit agencies funded with private and public monies.

Another non-profit agency, Housing Association for Napa Development (HAND), operates a low interest rehabilitation loan program in the City of Napa for both investor owned and owner occupied housing needing rehabilitation. HAND also provides weatherization and dead bolt locks for qualifying owners. The agency would be able to provide services outside the City of Napa in the unincorporated area with funding provided through the County of Napa.

6. APPENDIX

References

- Association of Bay Area Governments.
Correspondence with Napa County,
- Association of Bay Area Governments.
"Housing Need Report", Association of Bay Area Governments,
- Association of Bay Area Governments.
"Projections 79, 1980-2000", Association of Bay Area Governments,
- Association of Bay Area Governments.
"Projections 90", Association of Bay Area Governments, December 1989.
- California Department of Housing and Community Development.
"The Housing Directory, A guide to State, Federal and Local Housing and Community Development Laws and Programs", California Department of Housing and Community Development, February, 1978.
- California Department of Housing and Community Development.
"Housing Element Guidelines", California Department of Housing and Community Development, November, 1977.
- California Department of Housing and Community Development.
"Housing Element Manual", California Department of Housing and Community Development, March, 1978.
- California Employment Development Department.
"Annual Planning Information, Vallejo-Fairfield-Napa Standard Metropolitan Statistical Area, Napa County", San Francisco, California Employment Development Department.
- California Employment Development Department.
"Agricultural Employment Estimates", February, 1989.
- California Employment Development Department.
"Projections of Employment by Industry and Occupation". Vallejo-Fairfield-Napa Standard Metropolitan Statistical area, San Francisco, California Employment Development Department.

City of Napa.

"Housing Element, 1985 to 1990", City of Napa, April, 1986.

Napa County Board of Supervisors.

"Housing Condition Report, Napa County" Rural California Housing Corporation, October 1989.

Napa County Board of Supervisors.

"Napa County Energy Policy", Napa County Board of Supervisors, March, 1980.

Napa County Board of Supervisors.

"Napa Valley Housing Authority", John DeWeerd and Associates, February, 1989.

Napa County LAFCOM.

"American Canyon Incorporation EIR", Napa County LAFCOM, August, 1981.

Napa County Conservation, Development and Planning Department.

"1981 Update of the Land Use Element of the Napa County General Plan", Napa County Conservation, Development and Planning Department, November, 1981.

Napa County Conservation, Development & Planning Department.

"The Growth Management System Element of the General Plan", Napa County Board of Supervisors, August, 1981.

Napa County Conservation, Development & Planning Department.

"Napa County General Plan Housing Element", Napa County Board of Supervisors.

Napa County Conservation, Development & Planning Department.

"Zoning Regulations", Napa County Conservation, Development & Planning Department, various dates.

Napa County Conservation, Development & Planning Department.

"Housing Assistance Plan", Napa County Conservation, Development & Planning Department.

U.S. Department of Commerce.

"1980 Census of Population", U.S. Department of Commerce, Bureau of the Census.

APPENDIX B

Definitions

A. TERMS RELATED TO HOUSEHOLDS:

"Household"	*	All persons occupying a single dwelling unit.
"Family"	**	Any of the following: <ul style="list-style-type: none">a) One person occupying a dwelling unit;b) Two or more persons related by blood, marriage or legal adoption occupying a dwelling unit;c) A group not exceeding five (5) unrelated persons occupying a dwelling unit.
"Large family".....	*	A family of five (5) or more persons.
"Elderly".....	*	Persons 62 years of age or older.
"Handicapped".....	*	Persons determined to have a physical impairment or mental disorder which is expected to be of long continued or indefinite duration and is of such a nature that the person's ability to live independently could be improved by more suitable housing conditions.
"Very low income household"	**	A household whose income, with adjustments for household size, does not exceed 50% of the median household income of the (Vallejo, Fairfield, Napa) standard metropolitan statistical area.
"Lower income household"...	*	A household whose income, with adjustments for household size, does not exceed 80% of the median household income of the (Vallejo, Fairfield, Napa) standard metropolitan statistical area (SMSA).

"Middle income household" ..*	A household whose income, with adjustment for house-hold size, falls between 80% and 125% of the median household income of the Vallejo, Fairfield, Napa SMSA.
"Market rate household".....*	Those households that have the financial capability to meet their housing needs without sacrificing other essential needs.
"Nonmarket rate households"*	Households who do not have the financial capability to meet their housing needs without sacrificing other essential needs.

B. TERMS RELATED TO HOUSES:

"Dwelling unit"*	The place of customary abode of a person or household which is either considered to be real property under State law or cannot be easily moved.
"Deteriorated"* (Needing rehabilitation)	A dwelling unit which in its present state materially endangers the health, safety or well-being of its occupants in one or more respects, and which is economically feasible for repair.
"Dilapidate"*	A dwelling unit which in its present state materially endangers the health, safety or well-being of its occupants in one or more respects, and which is <u>not</u> economically feasible for repair.
"General housing market area"	A regional geographical unit, within which local interaction has resulted in an economic and social interdependence with respect to the provision of the housing, employment and service opportunities. (ABAG has established Napa County as a Housing Market Area).
"Affordable housing"	Housing Napa County households can buy or rent without paying over 30% of their income.

"Least cost housing".....

The most inexpensive, unsubsidized housing
the private market can provide.

* Source - The State Department of Housing and Community Development Element
Guidelines, November 17, 1977.

**Source - Napa County Ordinance #511 - County Zoning Ordinance.

APPENDIX C
Summary of State and Federal
Housing Assistance Programs

Title	Agency	Description	Subsidy Available	County Costs
Section 8	HUD	Housing assistance payment to lower income households to rent existing, new or rehabilitated units.	Varies with fair market rents and paying ability of qualifying tenants.	None. Rental subsidy and administrative costs paid by HUD
Section 202	HUD	Low interest loan to non-profit sponsor for production or substantial rehabilitation of elderly and handicapped rental housing.	Direct loan for 100% of costs; 40 year term; varying interest rate.	None.
Community Development Block Grant	HUD	Annual grant which may be used for housing and housing related programs <u>except</u> new construction.	Competitive.	Some local administrative costs for application. Implementation can be part of grant.
Title I	HUD	Insured home improvement loan through private lender.	\$15,000 maximum, 15 year term at market rate.	None.
Section 502	FMHA	Low interest loan to low and moderate income owners for single family housing purchase, repair, or construction.	33 year loan; 1%-8% interest.	None.
Section 514/516	FMHA	Low interest loan to non-profit sponsor for new housing for farmworkers.	50 units + \$400,000 maximum; 33 year term; 1% interest; combine with Section 8 payments.	None.
Section 515	FMHA	Loans to non-profit sponsors to buy, build or improve apartment-style housing for elderly and low and moderate income.	50 year term; 1%-8% interest; combine with Section 8 payments.	None.
Section 523	FMHA	Short-term loan or grant for site purchase and development of self-help, single family housing.	1 to 2 year grants; 3% interest loans.	None.
Section 524	FMHA	Site development loan.	2 year loan; 3%-8% interest.	None.

Title	Agency	Description	Subsidy Available	County Costs
Aftercare	State HCD	Low rent housing assistance for out patient disabled persons.	State applies for HUD funds for local governments, non-profits and developers.	None.
Urban Pre-development Loan Fund	State HCD	Loan to public agency and non-profit for pre-development costs of production or rehabilitation of subsidized, low-income housing.	Maximum loan of \$50,000; 2 year; 7% interest.	None.
Home Management Training HCD and Counseling	State HCD	Loan to public agency and non-profit for pre-development costs of production or rehabilitation of subsidized, low-income housing.	Maximum loan of \$50,000; 2 year; 7% interest.	None.
Farm-workers Housing Grant	State HCD	Grants to local sponsors for developing or rehabilitating housing for low-income agricultural employees.	505 matching grant.	505 matching funds.
Multi-Unit Direct Loan Program	State HFA	Direct loans to sponsors to finance multi-family rental developments for low and moderate income housing.	Low interest loan.	None.
Home Loan Program	State HFA	Purchase of mortgages originated by lending institutions.	7% interest rate for borrowers.	None.

Agency Key:

HUD - Department of Housing and Urban Development.

FmHA- Farmers Home Administration.

State HCD - State of California Department of Housing and Community Development.

State HFA - State of California Housing Finance Agency.

APPENDIX D

AFFORDABLE HOUSING TASK FORCE REPORT AND RECOMMENDATION

The Board of Supervisors created the Affordable Housing Task Force on March 12, 1985 with the following charge:

TASK FORCE CHARGE

The affordable Housing Task Force using as its basic resource document, the 1983 Napa County General Plan Housing Element, and using all other available resources and materials, shall complete within the time allotted the following assignments:

1. Study and develop an action program designed to utilize the Class 4 Affordable Housing Permit plus Class 2 and 3 Allocations as identified in the County's Growth Management System approved by the voters in 1980 and implemented by the Board of Supervisors in September 1981.
2. Investigate and develop an action program designed to most effectively utilize the current resources and long term potential of the Napa County Housing Authority to implement the County's General Plan Housing Element Housing Action Program. Such a program to include recommendations for financing as well as the provision of housing units in both the incorporated and unincorporated areas of the County.

The seven member Task Force* met ten times, (April 18, 1985 to January 24, 1986) securing specialized advice and counsel** in the course of reviewed various aspects of the total problem.

* Membership included Supervisor Kathleen McCullough (Chairman), Janice Haven (Conservation, Development and Planning Commissioner), James H. Hickey (Conservation, Development and Planning Department Director), Margaret Watson (Executive Director, Napa Housing Authority), Karen Elliott (Executive Director, HAND), Ned Brown (housing industry representative) and Chuck Shinnamon (developer).

** Assistance was provided by Christine Webb-Curtis (Program Development

Manager, Rural California Housing Corporation), Bill Hanna (President, Napa County Farm Bureau), Walter Szczepanek (Housing Rehabilitation Director, City of Calistoga), Hope Lugo (Executive Director) and Dan Ward (Planner) (both of Napa County Council for Economic Opportunity) and David Spaulding (Stonegate Winery).

The Task Force recommends that Napa County should implement the following proposals.

Recommendation:

1. Rehabilitate existing dwelling units:
 - a. Expand HAND programs to operate in the unincorporated area (using CDBG funds, if possible) to correct health and safety conditions. Households whose incomes are below 80% of median are eligible; but funds are repaid by the homeowner, and rents are secured at Housing Authority guidelines rates for 20 years.
 - b. Solicit the cooperation of the agricultural Community in supporting farm worker housing.
 - c. Develop an unincorporated area rehabilitation program which encourages substandard units to be brought up to current code requirement as legally recognized units.
2. Build new dwelling units:
 - a. Utilize density bonuses under the zoning ordinance to provide an inducement to builders to construct affordable housing.
 - b. Utilize County mortgage revenue bonds as a source of low-cost funding.
 - c. Utilize a "Tulare County" type approach (low-risk financing package for producing moderate-cost lease-option housing financed by local investors who benefit from tax incentives).
3. Plan and Prepare:
 - a. Revision/update of Housing Element of the County's General Plan.
 - b. Informational brochure to assist developers to understand Growth Management System Category 4 opportunities.
 - c. Informational letter or news release regarding Growth Management System category 4 concept directed to media and groups such as Napa-Solano Builders Exchange, Napa County Board of Realtors, etc.
 - d. Ongoing analysis of current potential funding sources for moderate

- income housing.
- e. Grant application for Community Development Block Grant, considering utilizing assistance of a non-profit housing organization (such as Rural California Housing Corporation) or a private consultant.
 - f. Use portion of CDBG funds for NCRIMS.
 - g. Definition of "farm labor housing" to eliminate loophole which allows large second homes to be constructed for other than farm laborers.

GROWTH MANAGEMENT SYSTEM



GENERAL PLAN

GROWTH MANAGEMENT SYSTEM

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	136
2. Annual Growth Rate Calculation	137
3. Building Permit Allocation	138
4. Appendix	146

FIGURES

50. Residential Building Permit Categories, Shares of Annual Allocation, Building Permit Availability Dates	141
51. Measure A Growth Management System; Building Permit Distribution System	142

1. INTRODUCTION

The Growth Management System Element of the Napa County General Plan was adopted as required by Slow Growth Initiative Measure A. (The text of Measure A, which was approved by the voters of Napa County in November, 1980, is Appendix A of this Element.) The Board of Supervisors made the implementation of Measure A a matter of high priority. The Conservation, Development and Planning Department was given primary responsibility to prepare a Growth Management System which satisfied both the intent and letter of Measure A, while at the same time limited government controls.

The Growth Management System Element of the General Plan describes the derivation of the 118 dwelling unit (D.U.) annual allocation, the division of the annual allocation into housing type categories, the timing and methods used for issuing building permits, and the required provisions for affordable housing units.

While the Growth Management System Interim Element of the General Plan is not a mandatory general plan element (in the sense of Government Code Sec. 65302) it satisfies the requirement (Government Code 65302.8) that the County is accommodating its share of regional need for housing for the following reasons:

First, the 1% population growth rate (as translated to an annual allocation of 118 D.U./year) approximates the Bay Area population growth rate of 1.13%.

Second, the total number of D.U.'s grandfathered will augment the annual allocation, in terms of the total number of units permitted.

Third, plans for Napa County, its constituent cities and ABAG, all call for city-centered urban development, which would reduce the unincorporated area's proportional share of the County's total share of the regional housing needs.

2. ANNUAL GROWTH RATE CALCULATION

The annual allocation of building permits, until the next U.S. Census, will be 118 D.U., not counting exempted/grandfathered units.

The 118 D.U. allocation was determined using data from the April, 1980 U.S. Census, in the following manner:

- 1) Multiply the occupied housing units in the unincorporated area (12202 in 1980) by 0.01 to account for 1% annual growth.
- 2) Divide 1) by 0.922 to account for the 7.8% vacancy rate of the unincorporated area in 1980.
- 3) Subtract 14 housing units from 2) to account for Superior Court Order #43475 (a stipulated settlement described in Appendix B).

To convert housing units into population, multiply the result of Step 2) by 2.7 Persons Per Household (PPH).

3. BUILDING PERMIT ALLOCATION

- 1) Character: Measure A defines "Character" as "the aesthetic and physical qualities which may be controlled, including density, building type (e.g., single family detached or attached, apartments, mobilehome parks) setbacks, height limits, landscaping, building coverage, color, siding material, roof overhang material, accessory buildings, parking, orientation, style and signing."

Regulated building types are divided into the following four categories:

- A) Category 1 is a single dwelling built by or for a permit holder (owner-builder or his contractor) who is building only one dwelling unit per year.
- B) Category 2 is any type of dwelling which requires no discretionary review, but the permit holder is building more than one dwelling unit per year. A good example would be the small scale builder using existing lots.
- C) Category 3 is any type of residential project for 2 or more dwelling units which requires discretionary review (e.g., subdivision, parcel map, use permit). A large-scale housing project would be a good example.
- D) Category 4 is housing which is affordable to persons with average or below average income. This category would require a development agreement signed by the developer and the County; the development agreement shall contain guarantees that the dwelling units would be affordable to persons of average or below average income.

The County would exercise the least control in Categories 1 and 2, and increasing levels of control over Categories 3 and 4.

2) Exempted Development:

The following types of construction are exempt from the provisions of the Growth Management System:

- 1) Industrial
- 2) Commercial
- 3) Commercial-Residential (daily rental)
- 4) Replacement housing (on the same site as a pre-existing unit which has been removed, demolished or burned within the past two years) (but not in conjunction with #5).

- 5) Relocation of existing units (already in the unincorporated area, but not inside the Lake Berryessa Take-Line).
 - 6) Additions, renovations, and refurbishments of existing dwelling units.
 - 7) Dwelling units located inside the Lake Berryessa Take-Line.
 - 8) Accessory buildings of any type (except dwelling units).
 - 9) Guest Cottages.
 - 10) Dwelling units for which building permit applications were filed by July 28, 1981.
 - 11) Dwelling units covered by development agreements approved prior to July 28, 1981.
 - 12) Dwelling units covered by both use permits and development plans approved prior to July 28, 1981 (i.e., Napa Meadows (434 D.U.), Silverado (280 D.U.), Meadowood (7 D.U.), Brookfield MHP (125 D.U.), Villa Berryessa MHP (202 D.U.), and Napa Estates MHP (208 D.U.)). (See Appendix B regarding Superior Court Order #43475.)
 - 13) Second units exempted pursuant to Gov. Code Sec. 65852.2.
- 3) Location of Growth: The Growth Management System defines "Location" as "Within the County, which sub-area, whether inside or outside the cities, or where on a specific site." The County's General Plan Population Distribution Policy reads, "...the County will plan for and accommodate the distribution of population among the sub-areas of the County, giving preference to the existing incorporated and urban areas." Higher density development would normally occur in the urban areas as a result of the availability of water and/or sewer facilities. Preference is to be given to the urban areas identified in the County's General Plan such as American Canyon, Angwin and those County islands surrounded by the City of Napa.
 - 4) Timing: The Growth Management System defines "Timing" as, "The number of building permits issued in one year and over several years." The annual allocation of building permits has been established at 118 D.U. per year.

When an annual allocation has not been used, the remainder may be carried over one year. The remainder ("X") which is carried over from "year 1" is immediately and continuously available in "year 2" (as described in Section 6 of the Growth Management System Element). However, the remainder

at the end of "year 2" must be reduced by "X" (but not made less than zero) on December 31st of "year 2." Category 1, 2 and 3 permits which would otherwise cease to exist at the end of "year 2" may be applied toward the 280 "reserved" Category 4 permits described in Appendix C.

At the discretion of the Board of Supervisors, the unused allocation in Categories 1, 2 and 3 could be transferred from one category to another (including additions to, but not subtractions from Category 4) in June and December. The Commission shall review the year's construction permit record and consider transfer of surplus allocations at its first meeting in June and its second meeting in November, each year. Following their review the Commission shall forward to the Board of Supervisors their recommendations for such changes in the allocation system, as they feel are warranted for the balance of the year, along with the supporting data for their recommendations.

- 5) "Affordable" Housing: Measure A requires that "at least 15% of those housing units permitted each year shall be for housing capable of purchase or rental by persons with average or below average income."

The 15% affordability housing requirement is described in the definition section of the report as follows:

"Income information provided annually by HUD shall be used; average shall mean the median. Capable of purchase or rental shall mean that not more than 30% of the (gross) household income shall be spent on housing costs such as rent payment, mortgage payment, insurance, taxes, and condominium membership fees."

Based on the most current HUD figures available, an "affordable" monthly payment range (equal to 30% of the November 1981 gross median household income in Napa County) would be between \$438 (for a one-person household) and \$781 (for an eight-person household). Depending on the impact of factoring for household assets, inflation, interest rates, downpayment requirements, insurance, taxes and miscellaneous fees, many housing developments might qualify as "affordable."

Affordable housing can be of any type (single family, multiple, mobilehome), although permanent mobilehomes proposed to be located outside mobilehome parks shall obtain a certificate of compatibility pursuant to Ordinance 677. It is estimated that mobilehomes and farm labor housing will meet the affordability criteria more readily than other types of dwellings. The 15% affordable housing (Category 4 in the Growth Management System) requires a Development Agreement. It is the developer's responsibility to identify how the unit(s) will meet the

"affordable" criteria, and this documentation will be included as part of the approved development agreement. (See page 48 of the Housing Element regarding incentives to the construction of affordable housing.)

Developers could count appreciation and tax write-off advantages into ownership affordability calculations. The development agreement will be standardized and xeroxed with blanks to be filled in, in order to expedite its processing.

The most recent HUD information will be used in calculating affordability. The most recent HUD figures at the time the unit is marketed may be used or an adjustment using the C.P.I. will be allowed if one year has passed and HUD has not issued a new figure.

- 6) Process of Distributing Building Permits: The adopted Growth Management System assigns a share of the annual allocation to each of four categories of regulated development as shown below:

FIGURE 50: RESIDENTIAL BUILDING PERMIT CATEGORIES, SHARES OF ANNUAL ALLOCATION, BUILDING PERMIT AVAILABILITY DATES

CATEGORY	SHARE OF ANNUAL ALLOCATION	BUILDING PERMIT AVAILABILITY DATES*
		January 1
1) Owner-Occupied	80 D.U.	80 D.U.
2) Small-scale Builder	16 D.U.	16 D.U.
3) Large-scale Builder	16 D.U.	16 D.U.
4) "Affordable" House**	6 D.U.	6 D.U.
* Unused permits in Categories 1, 2 and 3 will be considered for redistribution each June and November by the Conservation, Development and Planning Comm.		
**See Appendix C.		

FIGURE 51: MEASURE A GROWTH MANAGEMENT SYSTEM;
BUILDING PERMIT DISTRIBUTION SYSTEM

Category of Regulated Development*	Annual Allocation**	Building Permit Distribution Process:	
		When Supply Exceeds Demand	When Demand Exceeds Supply
1 Owner-Builder (one building permit per year)	80	First approved, First served	Lottery (Annually)
2 Small-Scale Builder (2 or more permits) (no discretionary review required) (final map must be recorded)	16	First approved, First served	Lottery (Annually)
3 Large-Scale Builder (2 or more permits) (discretionary review required)	16	Discretionary Review First approved, First served	Discretionary Review Lottery (Annually)
4 Affordable House (development agreement required)	6 [14 Reserved***]	May require discretionary review Development Agreement First approved, First served	May require discretionary review Development Agreement Lottery (Annually)
<p>*Note that the following types of development are exempted from regulation of the Growth Management System: industrial, commercial, commercial-residential (daily rental), replacement housing, additions to and renovations of existing dwelling units, certain house moving, dwellings inside the Lake Berryessa Take line, accessory buildings, guest cottages, units covered by development agreements approved prior to July 28, 1981, and units covered by both development plans and use permits approved prior to July 28, 1981.</p> <p>**Unused permits in Categories 1, 2, and 3 will be considered for redistribution each June and November by the Conservation, Development and Planning Commission</p> <p>***See Appendix C, Summary of Superior Court Order #43475 regarding disposition of the 14 reserved permits.</p>			

In order to distribute the shares of the annual allocation to ensure fairness to all applicants, the following two-step distribution system is recommended:

In the first step, building permits would be issued on a first-approved, first-served basis until all the permits in that allocation period for that category have been used. When the demand for permits in any category exceeds the supply available, the second step process, a lottery, is initiated. For example, in Category 1, (in which 80 additional building permits become available each year, each applicant whose plans have received all necessary approvals can immediately receive a building permit, if one is available. The first day of each January an additional 80 building permits is added to the Category 1 supply. Category 1 applicants whose plans are fully approved, can be issued permits until there are no more permits available in the Category 1 supply.

In the second step, permits are issued on the basis of a lottery. Building permit applications enter a lottery when they:

- a) Are approved for issuance of a building permit; but
- b) None is available in their category, and
- c) The backlog of approved applications exceeds the next available allocation of permits in that category.

All applications approved in the first half-year in which the supply ran out are drawn from the lottery as long as the new supply of permits lasts, until none of those approved applications is left. After all of those applications are assigned permits, the next time period of approved applications would be included in the lottery and those applications would be drawn from the lottery until they all were assigned permits. The lottery would continue until there was a surplus of permits available, which would allow a return to the first step process (first approved, first served).

For example, assume Category 1 experiences a surplus of applications during the last half of 1983, and the last available permit is issued October 19, 1983. All Category 1 applicants wishing to receive a permit between then and January 1, 1984 must wait until January 1st for permits to become available, at which time they could immediately be issued permits, if the backlog of fully approved applications is no more than 80. If there was a backlog of ten (10) approved applications as of January 1st, those applications would have permits reserved in their names,

which permits could be issued any time in the next 180 days. (If these reserved permits weren't issued in 180 days, they would revert to the Category 1 supply and be available to other applicants.) If the backlog on January 1st was 90, there would be a drawing at the first opportunity. The first 80 applications drawn would have permits reserved, as above, and the remaining ten would have to wait until January 1, 1985, at which time they would be guaranteed a reserved permit, as above. In this example, there would be no Category 1 permits issued in 1984 except to those applicants in whose name a permit was reserved.

The advantages of this system are as follows:

- 1) Applicants for building permits would experience minimum frustration since they would have some degree of certainty as to when they would get their permits and could plan their construction accordingly.
- 2) Applicants would realize it was to their benefit to submit complete plans as soon as they could, especially when asked for necessary additional information.
- 3) Administrative work would be kept to a minimum, since there would be no need for the County to select or grade applications by their relative merit. The choice of who gets a permit would be random, except that there would be some regard for precedence.
- 4) The main advantage of this system of distribution of building permits is that it limits governmental control. If the supply of building permits exceeds the demand for permits, there is no growth management control at all.

Various details of the system are as follows:

- 1) Lotteries, when necessary, would be by category. Lotteries for Category 1, held annually until a backlog is eliminated, would be for single permits, drawn one at a time. Lotteries for Category 2, held in January (when necessary) would be for single permits, drawn one at a time. Lotteries for Categories 3 and 4 would be held in January. Applications for groups of approximately four permits would be accepted to balance concerns for sharing the allocation and creating some minimal economies of scale.

- 2) Fully approved applications would be listed by Assessor's parcel number in order of approval on a chronological master list. That number would correspond to a numbered, three-part card; one part is mailed to the applicant, one part is copied and entered in the lottery and one part is kept on file.
- 3) Only one entry per person (household, business, corporation) could be included in each lottery. (This would not keep a contractor from building several homes, each under contract to a separate owner.)
- 4) Lottery cards would be dropped into a ballot box, one at a time, by the lottery secretary, mixed and drawn out one at a time by the lottery judge until all numbers have been drawn and listed in the order in which they were drawn.
- 5) A list of all the cards in the lottery would be displayed prior to the drawing; during the drawing the sequential order in which the cards were drawn would be noted on the xerox list. All cards would be drawn and listed, even if the number of permits available was exceeded, so each applicant would be assured he was not left out of the drawing.
- 6) The drawing operation must be conducted so as to be beyond reproach; the person who draws the numbers must be someone whose integrity and involvement bespeaks honesty and objectivity; for example, a clergyman.
- 7) Improvements required as a condition of approval for Category 3 and 4 proposals could be deferred by development agreement until permits are reserved; but would have to be completed between when the permits are reserved and issued. Once improvements were initiated (to some specific extent), the period for issuance of the reserved permits would be extended to one year (rather than 180 days).
- 8) All issued permits are subject to the UBC non-use revocation provision; revoked, surrendered or returned permits will be added to the supply of permits in the category in which they were issued, but will be made available only through lottery, in order to avoid speculation.
- 9) Permits are neither transferable upon sale of the parcel, nor transferable to a different site or substitutable for a different dwelling. Minor design changes are acceptable; major/structural changes, can be made only in case of 1) redesign for energy efficiency or 2) down-scaling due to economic necessity.

APPENDIX A: TEXT OF MEASURE A ADOPTED BY VOTERS NOVEMBER 4, 1980

NAPA COUNTY SLOW GROWTH INITIATIVE MEASURE A
Full Text of Ordinance

INITIATIVE ORDINANCE FOR A SLOW GROWTH GENERAL PLAN, REDUCTION OF COSTLY URBAN SPRAWL, AND THE PRESERVATION OF THE COUNTY'S UNIQUE CHARACTER AND AGRICULTURAL LANDS.

TO THE BOARD OF SUPERVISORS OF THE COUNTY OF NAPA:

We, signators hereof, being duly qualified and registered electors of the County of Napa, California, hereby petition the Board of Supervisors of said County and request that the following proposed ordinance be submitted immediately to a vote of the people at a regular or special election pursuant to the Election Code of the State of California, or that, in lieu of an election, the Board of Supervisors enact said proposed ordinance pursuant, to said Election Code. To the degree practicable, we would encourage that the proposed ordinance be placed on the ballot at the general election to be held November, 1980.

The People of the County of Napa do ordain as follows:

Section 1. Findings.

The People of the County of Napa find that mismanaged and unlimited residential growth causes conditions harmful to the public health, safety and general welfare and results in substantial increase in the cost of government services, loss of irreplaceable agricultural land, inadequate police and fire protection, increased traffic congestion, inadequate parks and recreation facilities, loss of open space; increased air pollution, deterioration of older urban areas, general urban sprawl, increased crime rate and overcrowded schools.

Section 2. Purpose.

The People declare that the foregoing conditions can be avoided, or alleviated, by the enactment of this Ordinance.

Section 3. Standards.

- (a) The annual number of new housing units permitted in the County of Napa (unincorporated area), through the year 2000, shall be limited to accommodate an annual population growth rate that shall not exceed that of the Nine San Francisco Bay Area Counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano) as such rate is reflected in the United States Census; provided, however, that said annual population growth rate limit shall not be permitted to exceed 1% in the County of Napa (unincorporated area). In setting the annual number of new housing units permitted, the Board of Supervisors shall use the most recent United States Census for determining the persons per household and the vicinity rate of the year-round housing units.
- (b) At least 15% of those housing units permitted each year shall be for housing capable of purchase or rental by persons with average or below-average income. The average income shall be based on the average income of residents of the County of Napa, based on the most recent Federal

Section 4. Programs.

- (a) General Plan Revision and Growth Management System. Within nine (9) months of the date this Ordinance becomes effective, the County of Napa shall amend its General Plan to comprehensively carry out the provisions enacted by this Ordinance, and shall enact, as part of the General Plan, a Growth Management System and such ordinances as are required to implement the intent of this ordinance, to regulate the character, location, amount, and timing of future residential development, in conformity with the standards and procedures contained in this Ordinance. If the County of Napa does not adopt a revised General Plan and Growth Management System and related ordinances as required by this ordinance within nine (9) months of date this Ordinance becomes effective, no building permits for non construction of residential units shall thereafter be issued by the County of Napa, nor shall any subdivision of land thereafter be approved, until such time as said General Plan revision and Growth Management System and related ordinances as required by this Ordinance are adopted as provided herein.
- (b) Review Following Census. The Board of Supervisors, as soon as it receives the relevant data taken during the month recent Census (U.S. Decennial Census and Mid-Decade Census), shall modify the Growth Management System to reflect any changes in the annual population growth rate for the Nine San Francisco Bay Area Counties as reflected in said census; provided, however, that all modifications shall be consistent with the provisions of this ordinance and in accordance with the standards contained in Section 3 herein.

Section 5. Severability.

If any portion of this ordinance is hereafter determined to be invalid, all remaining portions of this Ordinance shall remain in full force and effect, and to this extent the provisions of this Ordinance are separable.

Section 6. Amendment.

No part of this Ordinance shall be amended or repealed, except by a vote of the people.

Section 7. Effective Date.

This Ordinance shall take effect as provided by law.

Section 8. Ordinance Supersedes.

The provisions of this Ordinance shall be held to be the minimum requirements for the promotion of the public safety, health, convenience, comfort, prosperity, and general welfare. This Ordinance shall supersede any other ordinance, rule or regulation which has been previously adopted by the Board of Supervisors, or by a vote of the people to the extent that said Ordinance is not intended to interfere with, abrogate, annul, or repeal any ordinance, rule or regulation which has been previously adopted and is not in conflict with any of the provisions of this Ordinance.

APPENDIX B: DEFINITION OF TERMS AND PHRASES CONTAINED IN
THE MEASURE A GROWTH MANAGEMENT SYSTEM

(Terms and phrases are listed in the order in which they
appear in Measure A.)

- 1) New Housing Units: A room or connected rooms constituting a separate, independent housekeeping establishment for owner occupancy or rental or lease on a weekly, monthly or longer basis, physically separated from other rooms or dwelling units in the same structure, and containing independent cooking and sleeping facilities. May also be referred to as "dwelling units" or "residential units" and shall include mobilehomes (excepting those within the Lake Berryessa Take Line). Shall not include the rebuilding of an existing unit, the replacement of an existing unit by another, or the movement of an existing unit (currently outside the Lake Berryessa Take Line), or units exempted by "grandfathering."
- 2) Unincorporated Area: All of the County area located outside of city to town limits.
- 3) Population Growth Rate: The change in total population in one year's time stated as a percentage either increasing or decreasing. Calculations shall be based on U.S. Census data for the unincorporated part of Napa County (adjusted for annexations and incorporations), and the entirety of the 9-County Bay Area.
- 4) United States Census: Shall refer to censuses conducted by the U.S. Bureau of the Census, including the Decennial Census (24), the Mid-Decade Census (25), also referred to as the Quinquennial Census, provided that the Mid-Decade information includes all of the data required by the Growth Management System. May also be referred to as the most recent Federal Census (11).
- 5) Persons Per Household: The population in households divided by the number of occupied dwelling units in the unincorporated portion of Napa County. (Consistent with the 1970 Census definition App-4, PHC(1)-223)

"The average population per household is obtained by dividing the population in households by the number of household heads.

Head of Household. One person in each household is designated as the "head," that is, the person who is regarded as the head by the members of the household. However, if a married woman living with her husband was reported as the head, her husband was considered the head for the purpose of simplifying the tabulations. Two types of household heads are

distinguished - the head of a family and a primary individual. A family head is a household head living with one or more persons related to him by blood, marriage or adoption. A primary individual is a household head living alone or with nonrelatives only."

- 6) Vacancy Rate: The number of vacant year-round dwelling units divided by the total number of year-round dwelling units in the unincorporated portion of Napa County.
- 7) Year-Round Housing Units: Those dwelling units which are capable of year-round occupancy; excluding daily rentals and dwelling units within the Lake Berryessa Take Line.
- 8) At Least 15% of Those Housing Units Permitted Each Year: 15% of the annual number of permits which can be issued must be reserved for units capable of purchase or rental by persons with average income.
- 9) Housing Capable of Purchase Or Rental By Persons With Average Or Below Average Income: Income information provided annually by HUD shall be used; average shall mean the median. Capable of purchase or rental shall mean that not more than 30% of the (gross) household income shall be spent on housing costs such as rent payment, mortgage payment, insurance, taxes, and condominium membership fees.
- 10) Residents of the County of Napa: Persons who have a Napa County address as their primary residence, as specified by the Bureau of the Census on Page 1 of the 1980 Census form.
- 11) Most Recent Federal Census: (See 4)
- 12) Growth Management System: The comprehensive plan which is part of the County's General Plan and together with related ordinances (20), implements the Slow Growth Initiative, Measure A.
- 13) Character: Aesthetic and physical qualities which may be controlled, including density, building type (e.g., single-family detached or attached, apartments, mobilehome parks), setbacks, height limits, landscaping, building coverage, color, siding material, roof overhang and material, accessory buildings, parking, orientation, style and signing.
- 14) Location: Within the County - which sub-area, whether inside or outside the cities, or where on a specific site.

- 15) Amount: The number of new housing units approved for construction in one year.
- 16) Timing: The amount of building permits issued within one year and over several years.
- 17) Future Residential Development: The number of dwelling units to be permitted in the future through the controlled issuance of building permits in the unincorporated part of Napa County.
- 18) Adopt: To formally accept by vote of the Board, after public hearing and discussion, in the same manner as a General Plan element.
- 19) Revised General Plan and Growth Management System: (See 12)
- 20) Related Ordinances: (See 12)
- 21) Building Permits for New Construction of Residential Units: Permits for the construction of new dwelling units on a site. Does not include rebuilding, remodeling, renovating or enlarging existing units, or moving an existing dwelling unit from one unincorporated site (outside the Berryessa Take Line) to another unincorporated site, or units exempted by "grandfathering."
- 22) Any Subdivision of Land: Divisions of land which require discretionary action by the County; shall not include lot line adjustments, transfers of property or divisions in accordance with Ordinance #542.
- 23) Relevant Data Taken During the Most Recent Census: Information necessary to calculate the annual number of dwelling units to be permitted (see 4).
- 24) U.S. Decennial Census: (See 4)
- 25) Mid-Decade Census: (See 4)
- 26) Reflect Any Changes in the Annual Population Growth Rate: The maximum growth rate allowed shall be changed to match that of the 9 Bay Area Counties as soon as new information is available from the Census, but in no case can be greater than one percent.

APPENDIX C: SUMMARY OF RESULTS OF SUPERIOR COURT STIPULATION
AND ORDER #43475 - MARCH 5, 1982*

On August 18, 1981 the Board of Supervisors adopted the Growth Management System Interim Element of the Napa County General Plan as required by Measure adopted by the voters on November 4, 1980. The Growth Management System Interim Element as adopted in 1981, based on then-available U.S. Census information calculated the annual allocation of building permits at 134, divided into 80 owner-occupied units, 17 small-scale builder units, 17 large-scale builder units and 20 "affordable" dwelling units. The system also provided for exemptions including a total of 1,256 units "grandfathered" due to plans approved before July 28, 1981.

On March 5, 1982, a legal action challenging the annual 134 unit allocation and 1,256 exempted units was settled by a stipulated order. This order confirmed the 1,256 exempted units and annual 134 unit allocation but recategorized some of the 1,256 and 134 units. Of the 1,256 exempted units, 535 are mobile homes which, under the order, are considered as "affordable" housing. Of the 535 units, 280 are subject, under the order, to Measure A in that each year over the next 20 years a minimum of 14 of the 20 "affordable" units allocated as part of the 134 annual units must be "reserved" for exempted mobile home units. The remaining 6 "affordable" units each year may be used by anyone as well as any additional carryover units assigned to the "affordable" category by the County, or, if any of the 6 units and/or carryover units assigned to "affordable" are not used, they may be added to the annual 14 reserved for mobile home exempted units.

The order further stipulates that if all 535 mobile home park units exempted do not draw down their building permits by August 18, 1986, then based on the number not securing permits, a proportional share of the 280 reserved "affordable" units lose their status as reserved and must seek building permits with no preference under Measure A.

Aside from the 280 mobile home units subject to Measure A, the remaining 255 mobile home units and the 721 non-mobile home units making up the total 1,256 exempted units are not subject to Measure A and may be constructed at any time subject to normal County planning and building regulations.

* March, 1983 recalculation (based on April, 1980 U. S. Census information) revised these numbers (as shown on pages 137, 141 and 142) such that Categories 2 and 3 each have 16 units per year and the total annual allocation is reduced by 2 units per year.

SCHOOL FACILITIES



GENERAL PLAN

SCHOOL FACILITIES

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction, Goals and Policies	152
2. Existing School Facilities and Enrollments	154
3. Mitigation Measures and Implementation	157

FIGURES

52. Schools Attended by Students Residing in Napa County	155
53. School Districts in Napa County	156

1. INTRODUCTION, GOALS, POLICIES

INTRODUCTION

Public schools are an integral part of the modern society they serve. California statutes recognize the importance of such facilities and provide (Government Code Section 65303 (F)) that county general plans may include elements which speak to public schools. The School Facilities Element of the Napa County General Plan has been prepared in order to address the need for timely construction of new schools and to provide a mechanism to mitigate overcrowding whenever it should occur.

Providing public school facilities is difficult due to rapidly changing enrollment figures. Typically, the major cause for concern is enrollments which exceed school capacities, forcing school districts to restructure programs and provide new or interim facilities. Notwithstanding the nation-wide trend to a declining birthrate (which locally has resulted in declining enrollments in several schools) there are several public schools within the County whose enrollments may soon exceed their capacities.

State law authorized a county to require a dedication of land or payment of fees, or both, for elementary or high school classrooms and related facilities, as a condition of the approval of a residential development. Where a finding is made by a school district and concurred in by the board of supervisors that a condition of overcrowding exists, the board may not approve a rezoning for a residential use, grant a discretionary permit for residential use, or approve a tentative subdivision map unless either (1) an ordinance has been adopted governing the dedication of land and payment of fees, or (2) a finding is made of certain specific overriding factors.

A prerequisite to such an ordinance is provision in the general plan for the location of public schools.

GOAL: The primary goal of Napa County should be to work with the school districts serving Napa County to coordinate the provision of school facilities with new residential development.

POLICIES

Related Policies would include the following:

1. Coordinate an exchange of information with school districts regarding school needs and new residential developments.
2. Consider school districts' proposed school sites in relation to:
 - a. General Plan designations.
 - b. Geology and seismic considerations; topography; drainage; soils.
 - c. Location and general utility of land; population distribution.
 - d. Access, transportation facilities, utilities.
 - e. Conflicting or hazardous conditions (e.g. noise, traffic).

The results of the review to be forwarded to the appropriate school district board within 30 days from receipt of the referral.

3. Establish general school site location criteria such as:
 - a. New school facilities shall not be located within two miles of an airport unless approved by the State Department of Education.
 - b. School facilities shall, whenever practical, be located in areas designated in the appropriate general plan for urban development.
 - c. Coordinate County plans and ordinances to be supportive of single-session school use and to minimize the need for bussing students.

2. EXISTING SCHOOL FACILITIES AND ENROLLMENTS

The public schools listed in Figure 52 provide facilities for virtually all public school students in Napa County. Local enrollments have declined approximately 3% per year in recent years, resulting in the closure of 4 schools in Napa alone (Davis, Lincoln and Soda Canyon Elementary Schools and Ridgeview Junior High).

The following schools were overcrowded (i.e., their enrollment/capacity ratios exceeded 1.00) in February or March, 1983:

<u>School</u>	<u>E-C</u>
Alta Heights Elem.	1.14
Browns Valley Elem.	1.06
Capell Valley Elem.	1.07
Shearer Elem.	1.02
Napa High	1.01

Locally, overcrowding is less of a problem than deciding which schools should be closed in the face of declining enrollments, except in Capell Valley, Pope Valley and areas served by Fairfield-Suisun Joint Unified School District. Nevertheless, the County should stand ready to respond to reports of conditions of overcrowding by the school districts listed in Figure 52.

FIGURE 52: SCHOOLS ATTENDED BY STUDENTS RESIDING IN NAPA COUNTY

SCHOOL	GRADES	MARCH 1983 ENROLLMENT	MARCH 1983 CAPACITY	E-C
Calistoga Joint Unified				
1. Calistoga Elementary	K-6	385	500	0.77
2. Calistoga High	7-12	317	375	0.84
3. Continuation	9-12	12	20-25	0.5 ±
Fairfield-Suisun Joint Unified				
1. Falls School	K	225	240	0.94
2. Suisun Valley School	1-6	176	180	0.98
3. Green Valley Inter- mediate	7-8	508	510	1.00
4. Armijo High	9-12	1830	2157	0.85
Howell Mountain Elementary				
1. Howell Mt. Elementary	K-8	119	140	0.85
Napa Valley Unified*				
(as of 2/83)				
*NVUSD is recalculating its capacity figures				
1. Alta Heights Elemen.	K-6	390	342	1.14
2. Bel Aire Park Elem.	K-6	315	370	0.85
3. Browns Valley Elemn.	K-6	454	427	1.06
4. Capell Valley Elem.	K-6	30	28	1.07
5. Carneros Elem.	K-6	75	142	0.53
6. Donaldson Way Elem.	K-6	212	313	0.68
7. El Centro Elem.	K-6	326	399	0.82
8. McPherson Elem.	K-6	393	427	0.92
9. Mt. George Elem.	K-6	221	256	0.86
10. Napa Junction Elem.	K-6	300	541	0.55
11. Northwood Elem.	K-6	510	598	0.85
12. Phillips Elem.	K-6	345	399	0.86
13. Pueblo Vista	K-8	340	456	0.75
14. Salvador Elem.	K-6	233	399	0.58
15. Shearer Elem.	K-6	466	456	1.02
16. Snow Elem.	K-6	234	313	0.79
18. Vichy Elem.	K-6	232	370	0.78
19. West Park Elem.	K-6	176	228	0.77
20. Westwood	K-8	402	456	0.88
21. Wooden Valley Elem.	1,2,4	12	28	0.43
22. Yountville Elem.	K-6	120	200	0.60
23. Redwood Middle Sch.	7,8	939	1330	0.71
24. Silverado Middle Sch.	7,8	941	1276	0.74
25. Napa High	9-12	1774	1762	1.01
26. Vintage High	9-12	1847	1856	1.00
(Opportunity Class	9	30)		
(Temescal [Continua- tion]	10-12	78)		
Pope Valley Union Elem.				
1. Pope Valley Union El.	K-8	63	75	0.84
St. Helena Unified				
1. Monticello Elem.	K-5	17	60	0.28
2. St. Helena Elem.	K-5	503	approx. 700	0.72
3. Robt. L. Stevenson Intermediate	6-8	330	approx. 450	
4. St. Helena High Continuation	9-12	459 38	approx. 625 approx.	0.80
Winters Joint Unified				
1. Wolfskill (Continua- tion & Special Ed.)		43	90	0.48
2. Waggoner Elem.	K-5	467	480	0.97
3. 6th Grade Ctr.	6	86	120	0.72
4. Winters Jr. High	7-8	169	240	0.70
5. Winters High	9-12	296	390	0.76

Source: School Districts, C.D.P.D.

6/7/83

3. MITIGATION MEASURES AND IMPLEMENTATION

MITIGATION MEASURES

The following overcrowding mitigation measures can be used in varying degrees. Few of the measures can be initiated or implemented by the County.

1. Ignore problem and increase class sizes.
2. Use multipurpose rooms for special purpose classes (e.g. science laboratory classes); reduce use of rooms for teacher preparation.
3. Shorten minutes of instruction per class, while lengthening hours school is used per day, in order to increase the number of classes or sessions per day.
4. Use schools year-round.
5. Modify attendance boundaries and/or bus students to equalize space demands on existing facilities.
6. Pursue the possibility of getting additional monies to provide additional facilities, through sale of surplus school property, supplemental school bond issues; request tax increases.
7. Negotiate with subdividers to provide mitigation monies, school facilities and/or land for school use.
8. Enact an ordinance, which in overcrowded attendance areas, would require payment of money or the dedication of school facilities and/or land for school use, as a condition for approval of rezoning property to a residential use, or the grant of a discretionary permit for residential use, or approval of a tentative subdivision map for residential purposes.
9. Plan for a community development rate and population distribution which minimizes student overloading in each attendance area.
10. Extend the horizon of capital improvements programming for the construction of new schools 5-10 years in advance, in order to coordinate residential development, attendance boundary changes and bond elections for new school construction for long-term student population increases.

IMPLEMENTATION

Given that most of the mitigating measures listed on Page 157 are options reserved to school districts the County's role in implementing school overcrowding mitigation is limited. The County should implement the following policies:

1. Enforce Sections 11900 et. seq. of County Code of Ordinances which, in overcrowded attendance areas, requires payment of money, or the dedication of school facilities and/or land for school use, as a condition for approval of rezoning property to a residential use, or the grant of a discretionary permit for residential use, or approval of a tentative subdivision map for residential purposes.
2. Plan for a community development rate and population distribution which would minimize school overcrowding.

CIRCULATION



GENERAL PLAN

CIRCULATION ELEMENT

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	159
2. Existing and Future Travel and Transportation ... Patterns	163
3. Goals and Policies	183
4. Implementation Plan	194
5. Appendix	202

FIGURES

54. Highway System Functional Classification	161
55. Average Daily Traffic, 1981	162
56. Existing Fixed Route Transit Services	165
57. Existing Paratransit Services, 1982	166
58. Existing Vehicle Trip Distribution Patterns	169
59. Roadway Level of Service Concept	170
60. Approximate Maximum Service Volume by Highway Type	171
61. Roadway Segments Exhibiting Significant Congestion, 1981	173
62. Vehicle Trip Distribution Patterns, Year 2000 ...	174
63. Estimated Traffic Activity: Existing vs Year 2000	175
64. Average Daily Traffic, Year 2000 "Do Nothing" Alternative	176
65. Roadway Segments Exhibiting Significant Congestion, Year 2000	177
66. Highway Improvement Alternatives	178
67. Napa Valley Bypass Level of Service, Year 2000 ..	179
68. Southern County Highway Alternative.....	181
69. Impact Assessment: Potential Highway Improvement Alternatives	182
70. Transportation System Improvement Program	195
71. Highway Improvement Plan, 1983-2000	198
72. Highway Improvement Plan for Southern County, 1983-2000	199
73. Transit and Paratransit Plan	200
74. Non-motorized Transportation Plan	201

1. INTRODUCTION

The circulation system of a county plays an important role in the development patterns of an area. It provides the opportunity to integrate land use planning and transportation planning by assuring that all existing and future land use development areas have adequate circulation. The circulation system also serves a major role in the economic well being of an area by providing for the movement of persons and goods to, from and within the County.

In Napa County the circulation system is composed of state routes, county and rural roads, rail freight service, navigable waterways, a general aviation facility, transit and paratransit systems and bicycle routes. This system provides residents and visitors access to local and regional activity centers plus it serves tourists who travel to the wineries and the natural scenic areas in Napa and adjacent counties. Local railroad service and portions of the Napa River are used for the transport of goods and products to destinations outside Napa County.

State Guidelines

The State of California requires that all local general plans contain a circulation element. According to Government Code Section 65302(b) a circulation element must consist of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the land use element of the plan.

Since the circulation element was first required in 1955, transportation technology and needs in California have changed greatly, with the emphasis today on the development of a balanced, multimodal transportation system. In compliance with state guidelines, the Napa County Circulation Element has been developed to:

- o Coordinate the transportation and circulation system with planned land uses;
- o Promote the efficient transport of goods and safe and effective movement of all segments of the population;
- o Make efficient use of existing transportation facilities; and
- o Protect environmental quality and promote the wise and equitable use of economic and natural resources.

The Circulation Element of the Napa County General Plan is a long range plan for transportation: it defines the existing transportation network, and based on the target population of 130,000 for the planning year 2000, traffic forecasts were projected and travel demands and opportunities were assessed for all transportation modes. A series of alternative transportation improvement concepts were then developed and examined in terms of their ability to accommodate future travel needs within the framework of Napa County's general planning guidelines. Based upon this assessment, a series of goals and policy guidelines were prepared for each of the following areas in Napa County:

- Circulation and Land Use;
- State Highway Routes & County Routes;
- Transit and Paratransit Services;
- Air Transportation;
- Rail Service;
- Navigable Waterways; and,
- Nonmotorized Circulation.

These goals and policy guidelines (detailed in Chapter 3) provide the basis for improving the transportation network in Napa County in a complementary manner with the Land Use Element of the General Plan, emphasizing the need for a multimodal, balanced transportation system.

[illegible]

6/7/83

LEGEND

14,100 1981 AVERAGE DAILY TRAFFIC (ADT) (VEHICLES/DAY)

Map of Solano County, California, showing 1981 Average Daily Traffic (ADT) in vehicles per day. The map displays major highways and their traffic volumes. A legend indicates that the numbers in boxes represent ADT. A scale bar shows distances up to 4 miles. The map includes labels for various locations such as Calistoga, St. Helena, Napa, and Fairfield, as well as geographical features like Lake Berryessa and Lake Colusa.

162

6/7/83

2. EXISTING AND FUTURE TRAVEL AND TRANSPORTATION PATTERNS

Travel and transportation in Napa County is a function of its size, its relationship to the surrounding region and the spatial distribution of its population and major activity centers. Since Napa County is considered a rural, low density region and major trip attractors are dispersed throughout the county, the dominant mode of transportation is the private automobile. Transit usage is primarily limited to the transit dependent population (i.e. persons who have no independent means of travel). A summary of these and other transportation facilities in Napa County is provided in the following sections.

Highway System - The highway system in Napa County consists of state highways, county roads, and local streets. Figure 54 illustrates the functional classifications and Federal Aid designations of the roadways in the County. The major roadways include State Highway Routes (S.R.) 12, 29, 121, and 128; Silverado Trail; Trancas Street, Imola Avenue and Lincoln Avenue in the City of Napa; and several county roads, including Petrified Forest Road, Deer Park/Howell Mountain Road, Tubbs Lane, American Canyon Road, and Flosden Road.

The abovementioned roadways carry most of the traffic into, out of, and within the County. The network of rural roadways, including Oakville Cross Road and Yountville Cross Road, among others, serves to connect the major travel roadways with activity centers. As such, they are important links in the overall highway system, for both residents and visitors alike.

Figure 55 presents the 1981 average daily traffic (ADT) on County roadways.

Transit and Paratransit Services - Napa County is served by local and regional transit and paratransit services. There is one fixed route public transit system, a number of paratransit operators and several private companies providing transportation services to Napa County residents. The fixed route public transit system and Greyhound services are depicted in Figure 56 and the service coverage areas for the six paratransit operators are highlighted in Figure 57.

Air Transportation - There is one county owned and operated airport in Napa County located one mile west of the intersection of State Route 29 and State Route 12. This

airport is considered a general aviation facility which serves privately owned aircraft and provides quarters for a large pilot training program. The airport serves Napa County and the Vallejo area of Solano County. There are also two privately owned and operated general aviation facilities in Napa County; the Calistoga Soaring Center located in the southwest section of Calistoga and the Angwin Airport located due north of Pacific Union College.

Rail Service - Southern Pacific Transportation Company (SPTC) is the only rail service which serves Napa County. At the Napa Junction, located adjacent to State Route 29 between American Canyon Road and State Route 12, the rail extends in three directions. One line runs east into Solano County serving Suisun City while a second line heads west into Sonoma County where it connects with the Northwestern Pacific Railroad in Schellville. The Southern Pacific line in Napa County serves the Airport and extends northward to St. Helena with tracks running parallel to State Route 29. Rail service from St. Helena to Calistoga has been discontinued.

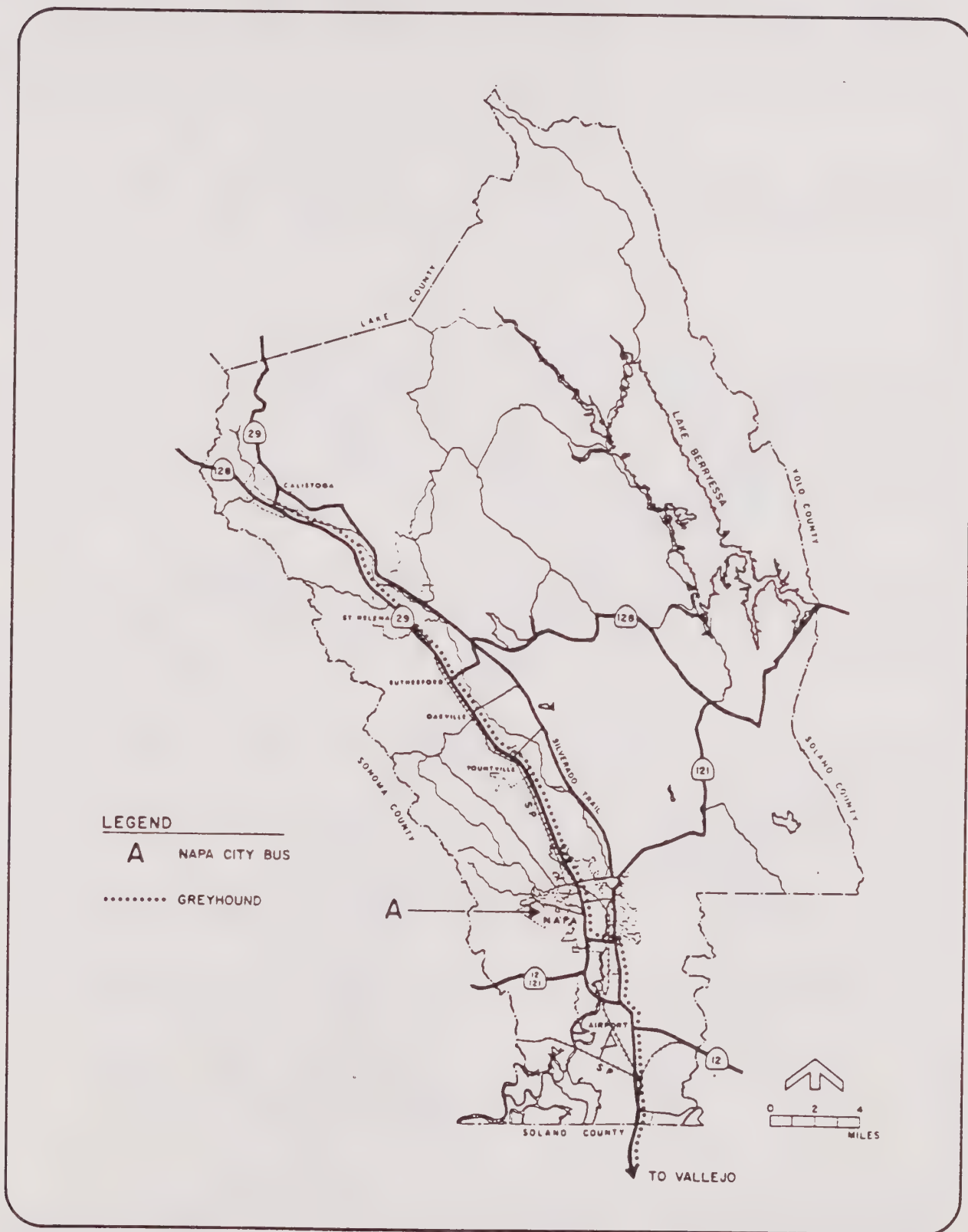
Waterway Transportation - Water related activities (sailing, fishing, boating, swimming, etc.) dominate the use of the two major waterways; Lake Berryessa and the Napa River. Lake Berryessa is located in the northeastern section of Napa County and is surrounded by seven privately owned resorts and has several camping grounds bordering its western edge. There is one public boat launching facility that was installed by the U.S. Bureau of Reclamation and the State Department of Waterways.

The Napa River also provides excellent opportunities for recreational activities and is used for industrial purposes as it connects with coastal and other adjoining navigable waterways.

Currently, the three large barge users in Napa County are Kaiser Steel Plant, Leslie Salt and Basalt Rock Company which transport the bulk of their freight to either Mare Island or out to the Pacific Ocean. The actual freight tonnage transported on the river fluctuates according to the seasons and more importantly to economic conditions.

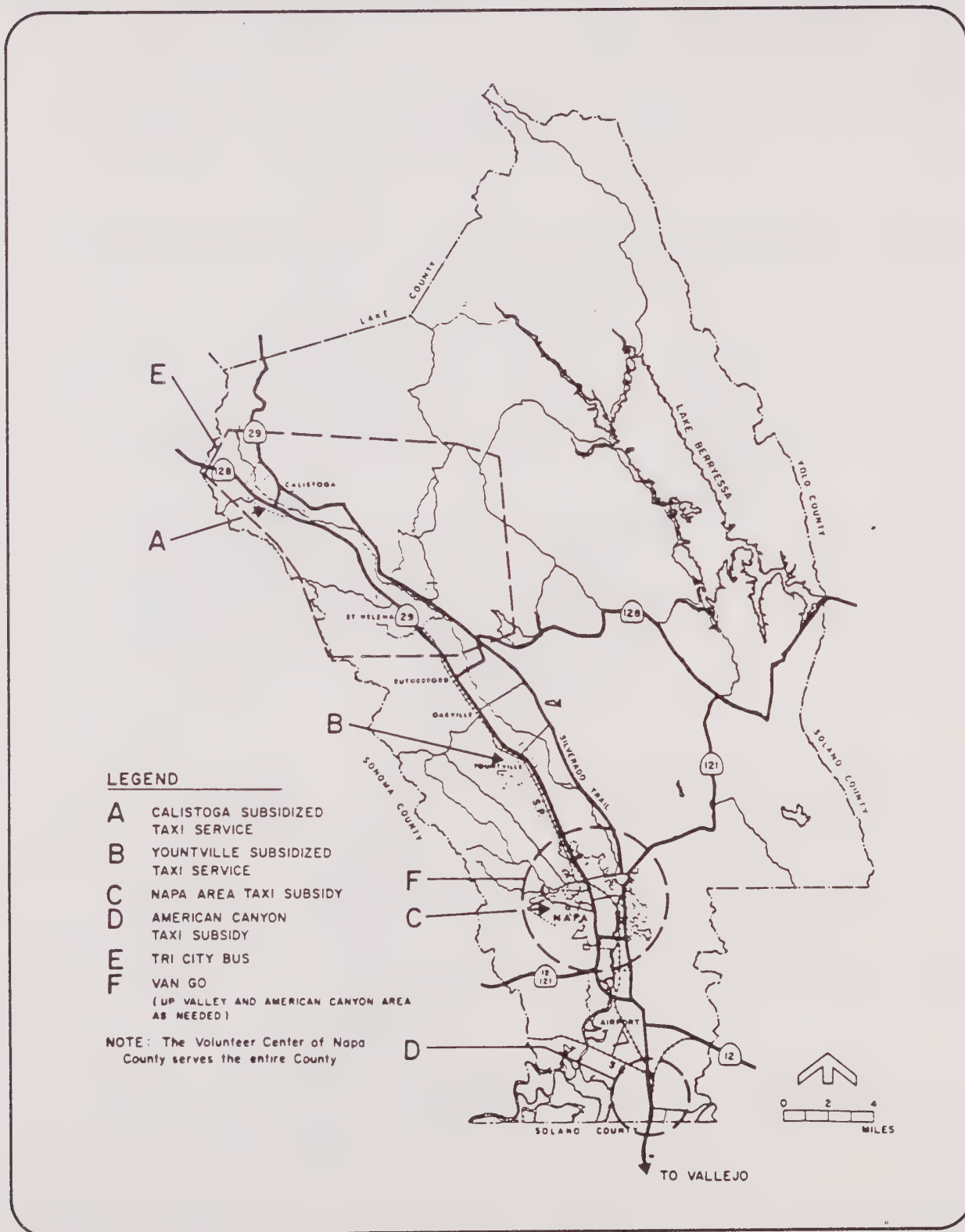
Nonmotorized Transportation - Nonmotorized transportation refers to pedestrian and bicycle travel. In Napa County, the existing bicycle routes and hiking trails are somewhat limited and do not form a cohesive development pattern. In the central Angwin area, there is a bicycle and pedestrian trail, enabling persons to walk or bicycle to Pacific Union College along College Avenue and Howell Mountain Road. The City of Napa has one bicycle lane that proceeds north on Coffield Avenue to "F"

FIGURE 56: EXISTING FIXED ROUTE TRANSIT SERVICES



Source: Wilbur Smith & Associates

FIGURE 57: EXISTING PARATRANSIT SERVICES, 1982



Source: Wilbur Smith & Associates

Street where it continues on Solano Avenue toward the Town of Yountville. In the American Canyon area, bicycle and pedestrian trails are designed to connect newly constructed residential units and schools, enabling school age children to travel to/from school without parental assistance. The existing paths cross the bridge over the American Canyon Creek with connections to the Donaldson Way School.

Although the Silverado Trail does not have an official bicycle lane, the eight foot paved shoulder is frequently used as a bicycle lane for persons bicycling in the valley from Napa to Calistoga.

Existing and Future Travel Patterns

The dominant mode of travel in Napa County is the private vehicle. Other modes are used to a certain extent, and provide residents and visitors with alternatives to the private automobile. While all travel modes are addressed in the circulation element, the highway transportation system provides the greatest amount of information regarding travel patterns in the County, and is therefore focused upon in this section.

The existing use levels of alternative modes are discussed in a subsequent chapter of the element, in the context of goals and policy guidelines. The objective of these goals is to enhance the travel opportunities in the County and thereby increase overall mobility.

Existing Traffic Distribution - The existing vehicle trip distribution in Napa County was estimated after reviewing several sources, including the Napa County Balanced Transportation Study (1973), CalTrans' Traffic Volumes on State Highways, Census data regarding population and employment, the Association of Bay Area Governments (ABAG) Projections '79, and the Metropolitan Transportation Commission's Bay Area Commuter Data.

Figure 58 illustrates the estimated existing trip distribution in Napa County. The resulting existing vehicle trip distribution is as follows:

• Total vehicle trips:	353,000
- Through Trips:	4,000
- Internal/External Trips:	61,000
- Internal Trips:	288,000

The above distribution represents an average situation. During the peak traffic season, which generally occurs during summer, overall traffic levels are typically about 20 percent greater than the average./1/ Most of this increase is

attributed to increases in recreational or pleasure trips entering, leaving, or crossing the County. However, internal trips also are greater during the summer due to recreational trips originating and ending within the County and the occurrence of multiple, linked trips (e.g., an out of County traveler may only make one trip to the County, but may make several trips within the County).

The Level of Service Concept - The quality of traffic service provided by a roadway system is measured in terms of the capacity of the system versus the traffic volumes which use the system. The Level-of-Service (L.O.S.) concept is a standard means of expressing the types of traffic conditions associated with various levels of traffic volumes versus capacity. There are six Levels-of-Service, levels A through F, which relate to peak period driving conditions from best to worst, respectively. The characteristics of traffic flow for these various Levels-of-Service are summarized in Figure 59.

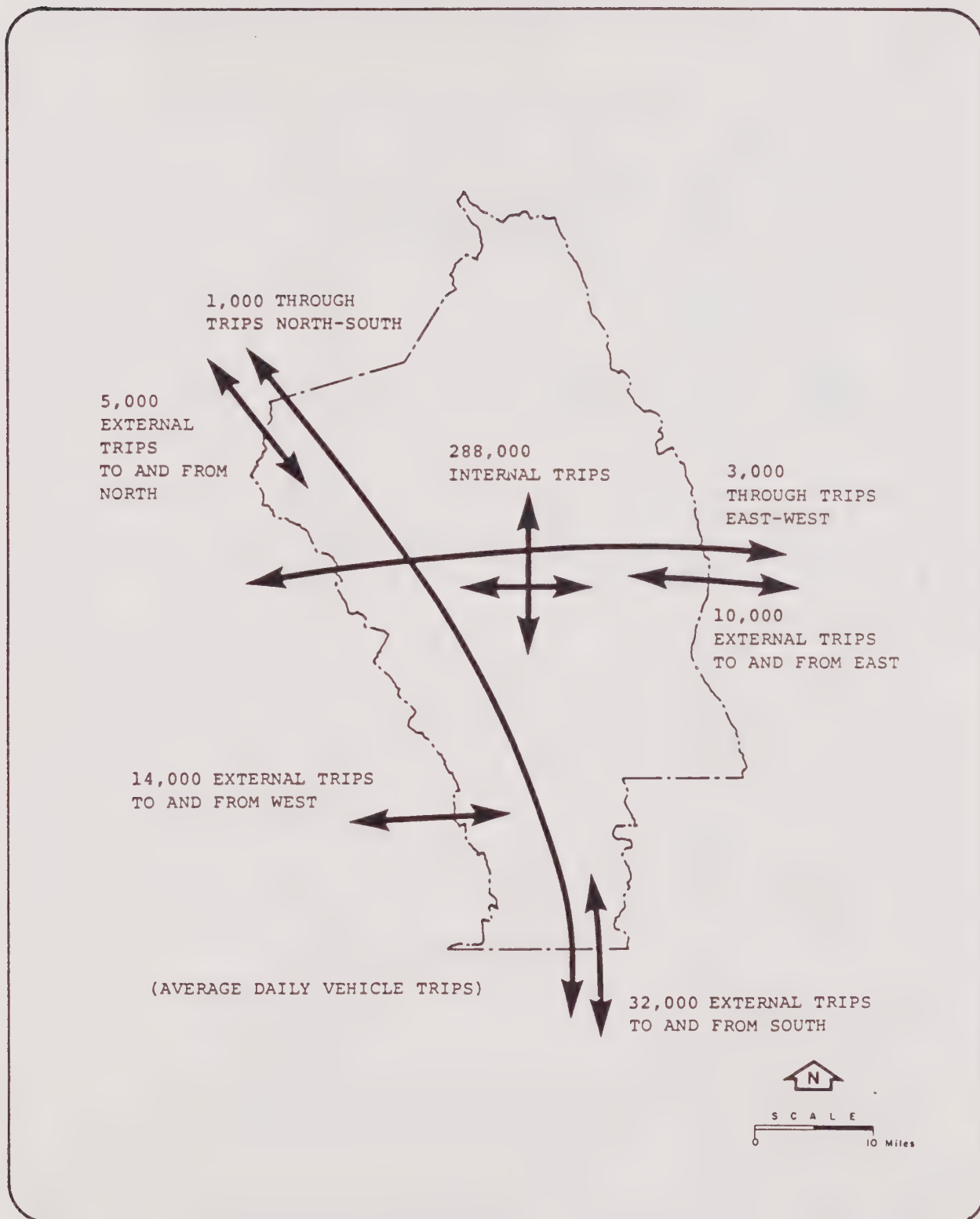
Level of Service "D" is defined as a condition approaching unstable traffic flow, under which speeds and maneuverability are restricted. Roadways operating at L.O.S. D or lower are considered candidates for improvements. Traffic conditions at this service level begin to inhibit travel opportunities and reduce the quality of life in Napa County.

Figure 60 presents a generalized breakdown of highway service volumes as they relate to levels of service. The major roadways were divided into general segments, based upon functional layout and topography for analysis of existing traffic volumes and capacities. Using procedures adapted from the Highway Capacity Manual, capacities for each general highway segment were calculated./2/ These were then compared with existing traffic volumes to identify general levels of service and thus problem areas.

The effects of interference with through traffic by other vehicles or pedestrians entering, leaving, or crossing roadways is evident in Figure 60, below. The greatest service volume is offered by controlled access highways. As the degree of access control is reduced, capacity (or maximum service volume) is reduced due to interference with side traffic and pedestrians. On Figure 60, this is illustrated by the progressive reduction in maximum service volumes for multilane rural highways and urban/suburban arterials.

To maximize the capacity on roadways such as S.R. 29 and Silverado Trail, which provides access to major activity centers (wineries and shopping centers, for example), careful attention must be paid to the location and spacing of new driveways serving new developments. By doing so, the forecast increases in traffic due to new development can most

FIGURE 58: EXISTING VEHICLE TRIP DISTRIBUTION PATTERNS



Source: Wilbur Smith & Associates

FIGURE 59: ROADWAY LEVEL OF SERVICE CONCEPT

LEVEL OF SERVICE A

- Free flow conditions
- Low volumes
- High operating speed
- Uninterrupted flow
- No restriction on maneuverability
- Drivers maintain desired speeds
- Little or no delays

LEVEL OF SERVICE B

- Stable flow condition
- Operating speeds beginning to be restricted

LEVEL OF SERVICE C

- Stable flow but speed and maneuverability restricted by higher traffic volumes
- Satisfactory operating speed for urban conditions
- Delays at signals

LEVELS OF SERVICE D

- Approaching unstable flow
- Low speeds
- Major delays at signals
- Little freedom to maneuver

LEVEL OF SERVICE E

- Lower operating speeds
- Volumes at or near capacity
- Unstable flow
- Major delays and stoppages

LEVEL OF SERVICE F

- Forced flow conditions
- Low speeds
- Volumes below capacity, may be zero
- Stoppages for long periods because of downstream congestion

FIGURE 60: APPROXIMATE MAXIMUM SERVICE VOLUME BY HIGHWAY TYPE

Table 2
APPROXIMATE MAXIMUM SERVICE VOLUME BY HIGHWAY TYPE
Napa County Circulation Element Study

Level of Service	Two Lane Rural			Multi-Lane Rural	Urban/ Suburban	Controlled
	Level	Rolling	Mountainous	(No Access Control)	Arterials	Access Highways
	(Vehicles Per Hour Two-Way)			(Vehicles Per Hour Per Lane)		
A	800	600	400	600	400	700
B	1,200	1,000	500	900	600	1,000
C	1,400	1,200	650	1,100	800	1,200
D	1,700	1,400	800	1,300	1,000	1,400
E	1,900	1,600	900	1,600	1,200	1,700
F	1,900+	1,600+	900+	1,600+	1,200+	1,700+
-	-	-	-	-	-	-
Example Napa County Highway	SR 29 (part)	SR 12; Silverado Trail	SR 128; SR 29 (part)	SR 29 (Trancas St. to Yountville)	Trancas Street; Soscol Avenue	SR 29 SR 12/121 to Trancas St.)

Source: Wilbur Smith and Associates, adapted from the Highway Capacity Manual (op.cit.)

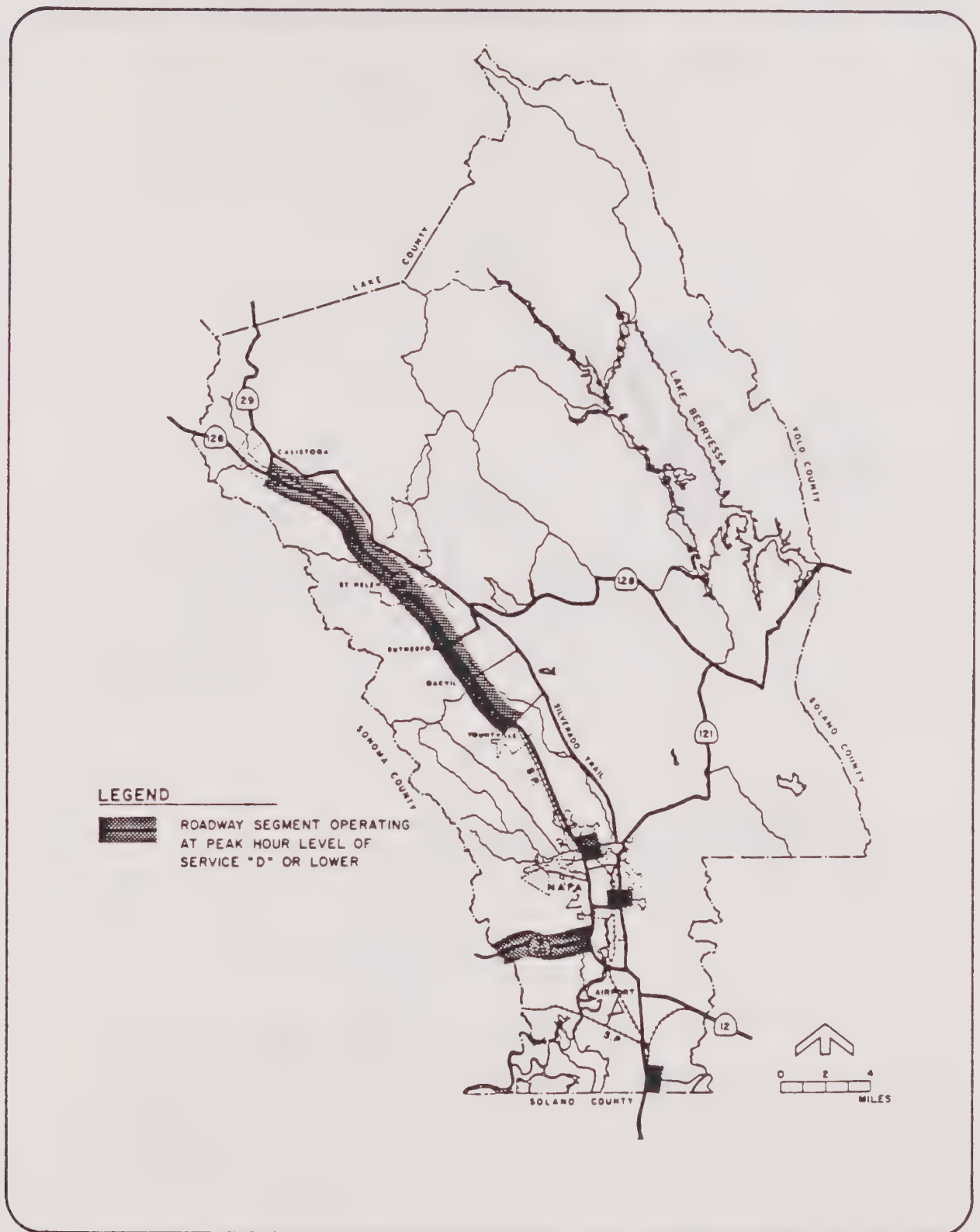
effectively be accommodated, with the least amount of negative impact, in conjunction with the Land Use Element of the General Plan. So called "strip commercial" development would, in effect, turn S.R. 29 or Silverado Trail into a suburban arterial, with associated reductions in maximum service volumes, if driveway location and spacing are not carefully evaluated. This is not to say that roadside activity centers should be discouraged, but that their locations and access points coordinated to minimize traffic and other impacts. Use of frontage roads or multiple-development driveways could be advantageous in this respect. This kind of improvement could take the form of frontage roads, which could tie existing developments' access roadways together with that of a proposed development. Estimated, or observed, traffic generation should be a primary consideration in selection of location for the connection with the major arterial, as should physical feasibility and the land use element. As part of the approval and plan check processes, the County could request that developers present alternative plans, with corresponding traffic frontage road, individual driveway, or combined driveways. This would allow careful scrutiny by County staff, with the objective being to optimize the use of already-improved intersections, without overloading them, rather than creating new, minor, intersections which could potentially reduce the capacity of a roadway segment. Applicable County, State and American Association of State Highway and Transportation Officials (AASHTO) standards should be applied with respect to different kinds of roadways.

Figure 61 illustrates roadway segments which currently operate at L.O.S. D or lower during the peak hour. The peak periods for traffic on County roadways are generally during the late afternoon. It is emphasized that Figure 61 is representative of average peak hour traffic conditions, and does not represent seasonal peaking characteristics. Traffic conditions would deteriorate further during the peak summer season.

Year 2000 Traffic Distribution - Based on growth forecasts developed by the Conservation, Development, and Planning Department, documented in the Land Use Plan of the Napa County General Plan, (See Wilbur Smith and Associates, Working Paper 2 , August 1982 for further detail.)

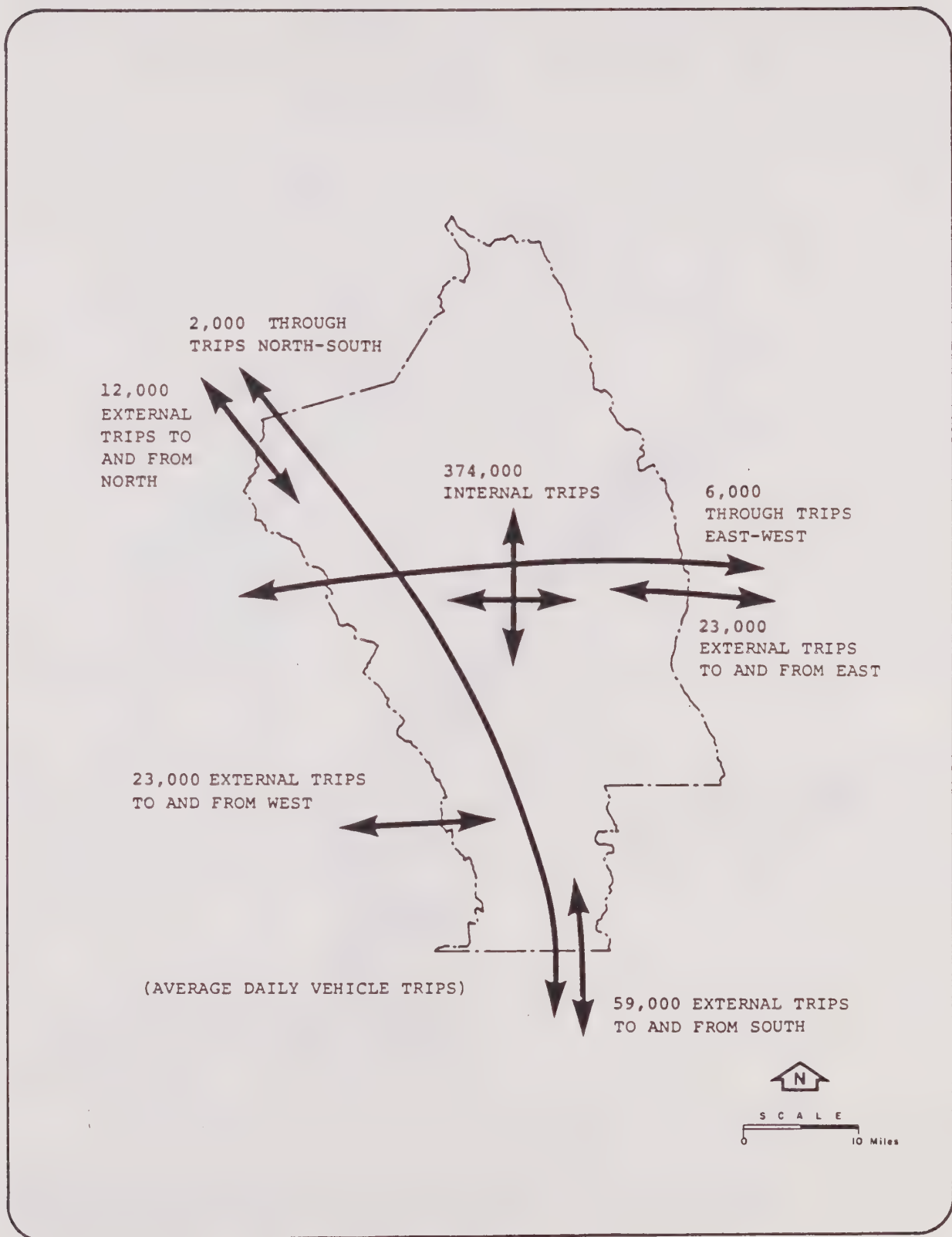
Figure 62 illustrates the estimated year 2000 vehicle trip distribution. The traffic forecasting procedure resulted in an overall increase of 41 percent over existing traffic activity. The table below presents the estimated number and percent changes in the three kinds of trips.

FIGURE 61: ROADWAY SEGMENTS EXHIBITING SIGNIFICANT CONGESTION, 1981



Source: Wilbur Smith & Associates

FIGURE 62: VEHICLE TRIP DISTRIBUTION PATTERNS, YEAR 2000



Source: Wilbur Smith & Associates

FIGURE 63: ESTIMATED TRAFFIC ACTIVITY: EXISTING VS. YEAR 2000

<u>Trip Kind</u>	<u>Existing</u>	<u>Year 2000</u>	<u>Total</u>	<u>Percent Change of Total</u>	<u>Annual Rate</u>
Total	353,000 veh/trips	499,000	+ 41	100	+2
Internal	288,000	374,000	+ 30	59	+2
Internal/ External	61,000	117,000	+ 92	38	+5
Through	4,000	8,000	+100	3	+5

Source: Wilbur Smith & Associates

Relatively major increases are forecast for internal trips and through trips. These are attributed to growth in visitor traffic to, from, and through the county as well as growth in activity centers, including work places, outside of the county.

Figure 64 presents the projected average daily traffic levels under the year 2000 traffic distribution. This distribution assumed no major changes in the highway system. Figure 65 illustrates the resulting concentrations of traffic congestion, based upon the projected traffic levels, and thus the areas which must be focused upon as regards improvements in the next 20 years. Figure 65 is representative of average peak hour traffic conditions -- that is, the peak conditions which would be evident during the summer season would deteriorate traffic levels further than indicated in Figure 65.

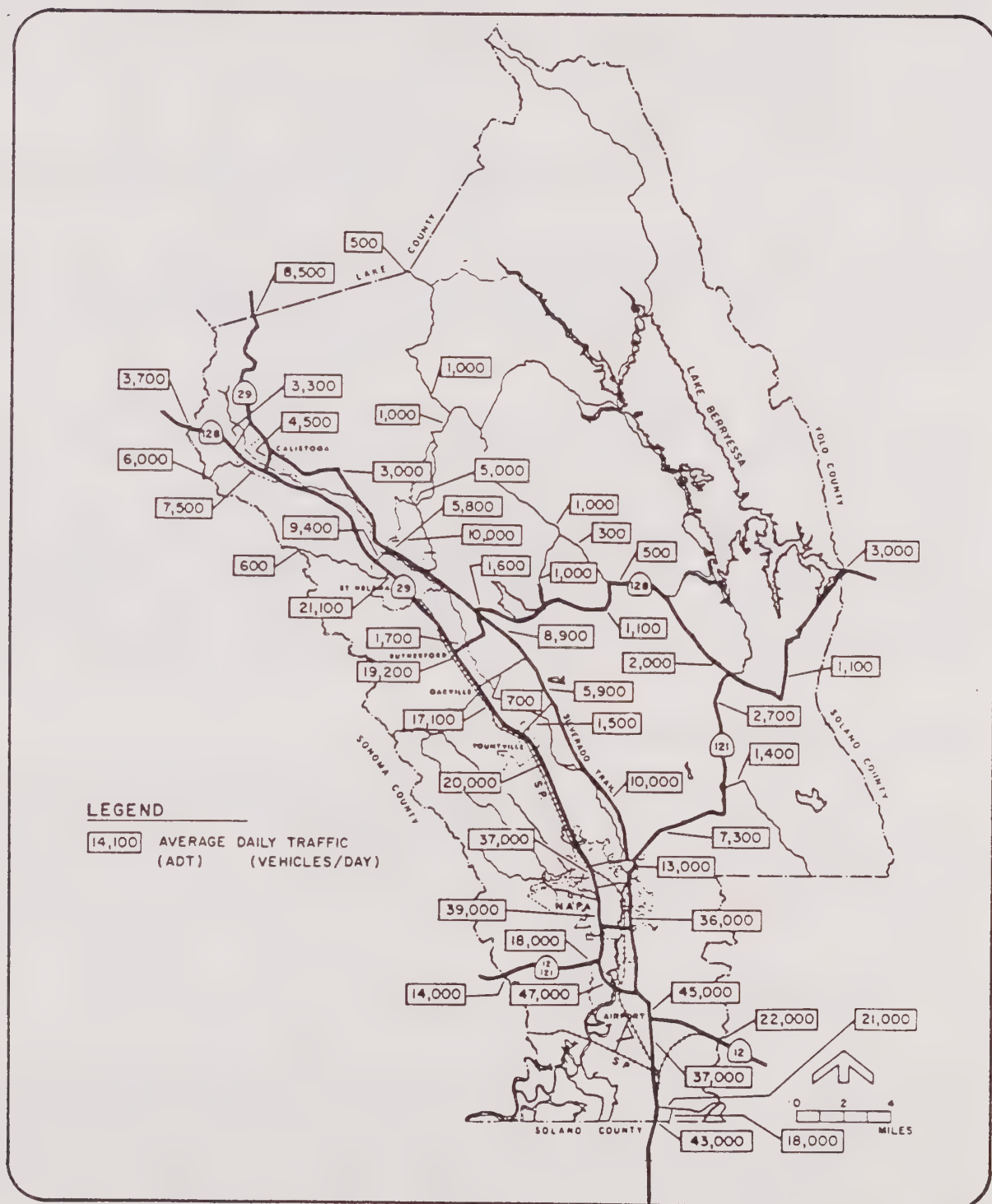
Alternative Developments and Assessment

Several alternative highway improvements were developed to mitigate the forecast year 2000 congestion levels in Napa County. The alternatives were then assessed with respect to potential impacts on traffic, the general public, and business/industrial development in the County. The alternatives, procedures used and results obtained are detailed in Working Paper 2 of this study.

Alternative Highway Improvements -

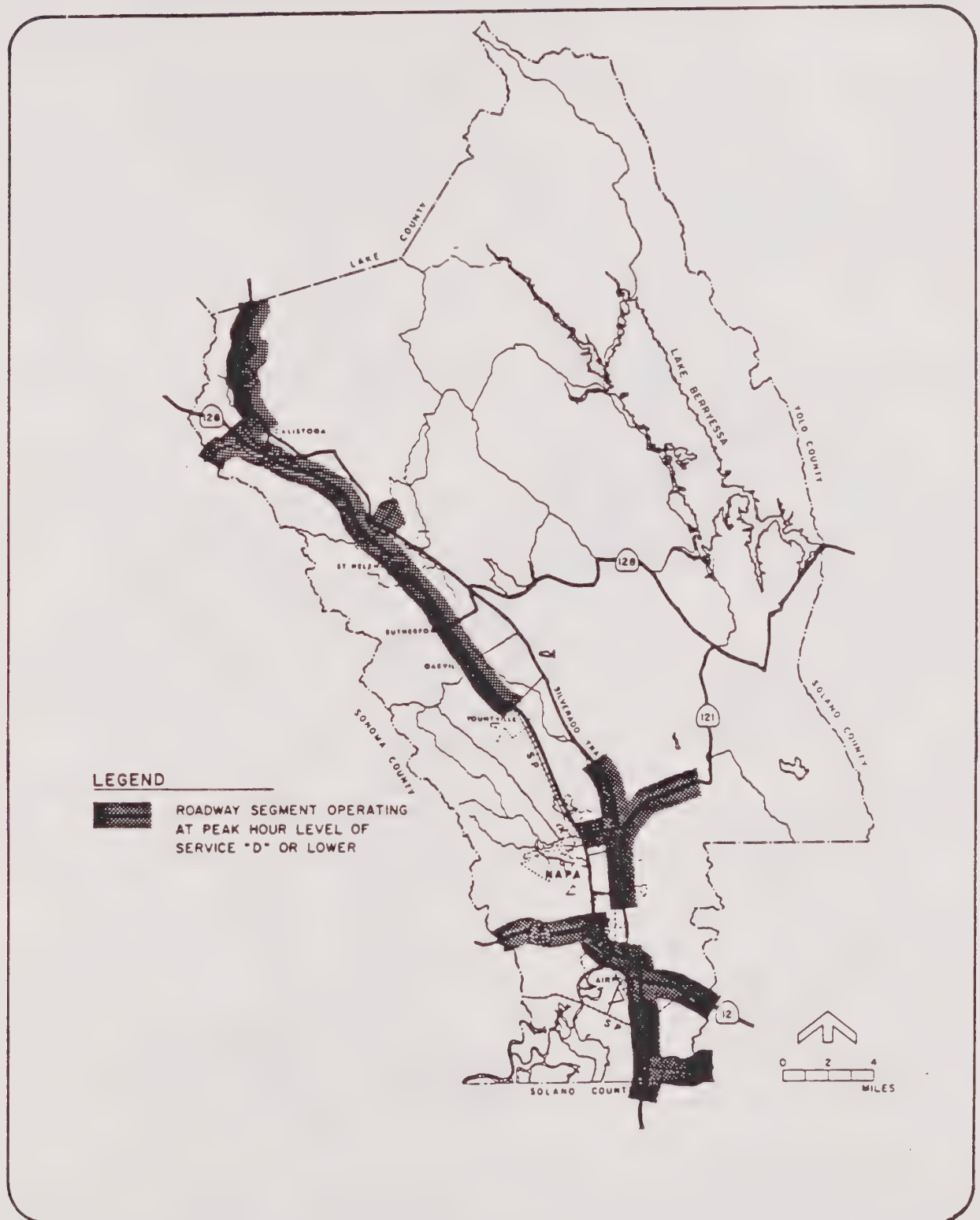
Napa Valley Bypass - The Traffic assignment for the Napa Valley Bypass alternative was derived by applying the CalTrans traffic Diversion Procedure to the forecast year 2000 traffic levels (Figure 64). This procedure estimates the percent of trips which currently use the basic route but would divert to the new freeway route due to travel time and distance savings offered by the new route. Several representative trips were tested using this procedure, including one between the cities of Napa and Calistoga and internal/external trips (northbound and southbound) which would originate in the central area of Napa County. All north/south through trips were assigned to the Napa Valley Bypass. This assessment indicated that the Napa Valley Bypass would not reduce travel time or distance significantly for most trips originating or ending, or both

FIGURE 64: AVERAGE DAILY TRAFFIC, YEAR 2000
DO NOTHING ALTERNATIVE



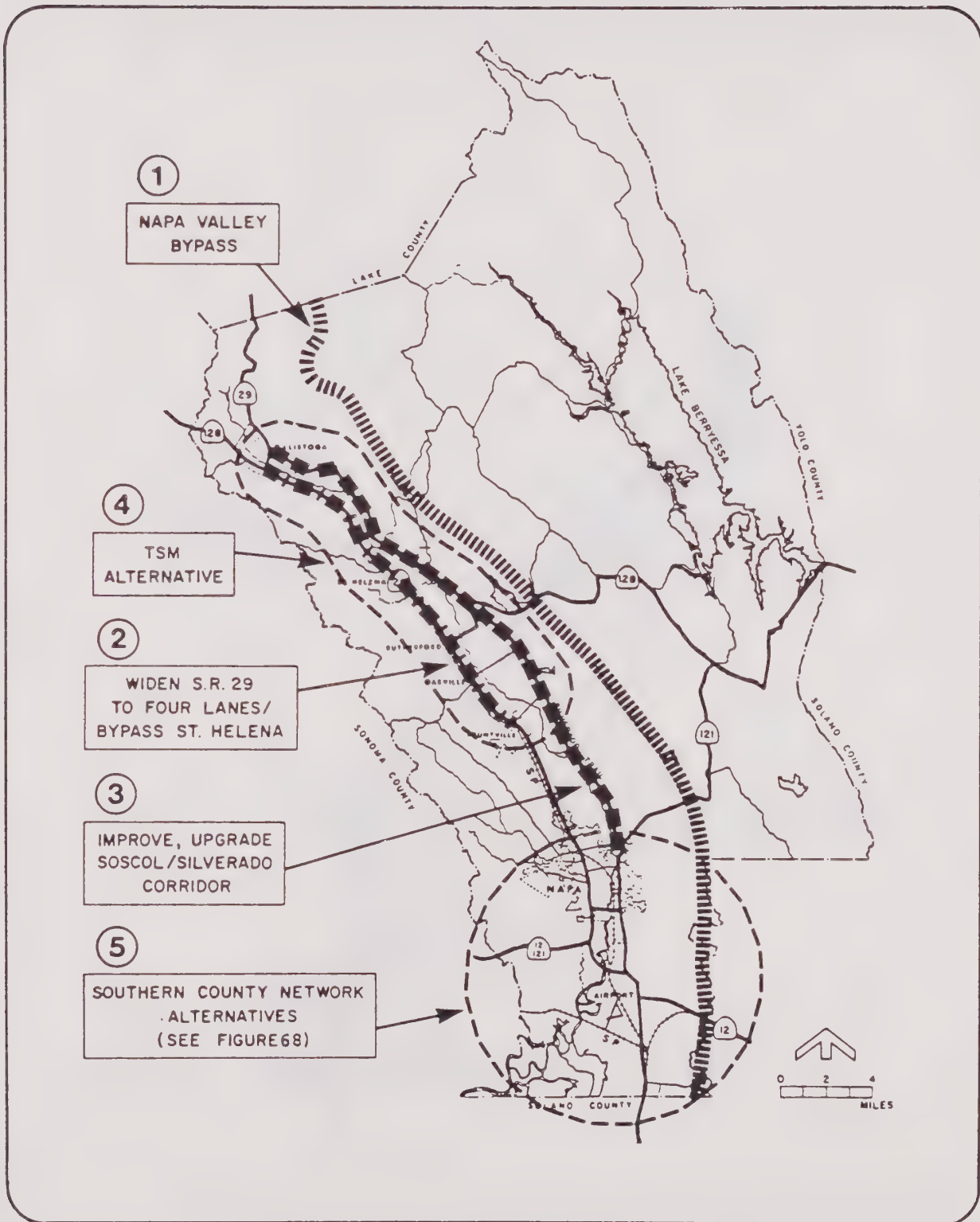
Source: CalTrans (1980 & 1981 Counts), Napa County Public Works Department, Wilbur Smith & Associates, 1982

FIGURE 65: ROADWAY SEGMENTS EXHIBITING SIGNIFICANT CONGESTION,
YEAR 2000



Source: Wilbur Smith & Associates

FIGURE 66: HIGHWAY IMPROVEMENT ALTERNATIVES



Source: Wilbur Smith & Associates

within the county. This finding was expected due to the location of the Bypass alignment -- it bypasses major activity centers. To use the new facility, in many cases, would involve both more time and distance for the average user.

The Bypass would, however, accommodate through trips, and these trips would constitute the majority of the traffic on the new facility. Also, some internal/external trips to and from the north, which currently use S.R. 29, would be diverted to the new facility, depending on the directness of travel. Overall it was estimated that approximately 8,000 to 10,000 total vehicles per day would use the new facility. Of these, approximately 4,000 through and internal/external trips would be diverted from S.R. 29, and the remainder of the trips which would use the Bypass would originate and end within the County. Minor improvements in peak hour L.O.S. on S.R. 29 would be experienced in the year 2000 with the implementation of the Napa Valley Bypass, as listed in the table below.

FIGURE 67: NAPA VALLEY BYPASS LEVEL OF SERVICE, YEAR 2000

<u>Segment of S.R. 29</u>	<u>Peak Hour Level of Service</u>	
	<u>With Bypass</u>	<u>Without Bypass</u>
Calistoga to Lake County (Max.)	D/E	F
Yountville to Calistoga (Max.)	E	F
Trancas St. to Yountville (Max.)	B	B
S.R. 121/12 to Trancas Street	B	B/C
Solano County to S.R. 121/12	D	D

Source: Wilbur Smith & Associates

As indicated above, the limited estimated diversion of traffic from S.R. 29 to the Bypass would limit the potential benefits as regards congestion reduction on S.R. 29. Peak hour L.O.S. on the four lane Bypass would be "A."

Twelve highway improvement alternatives developed during the course of the study are depicted in Figures 66 and 68 and listed below.

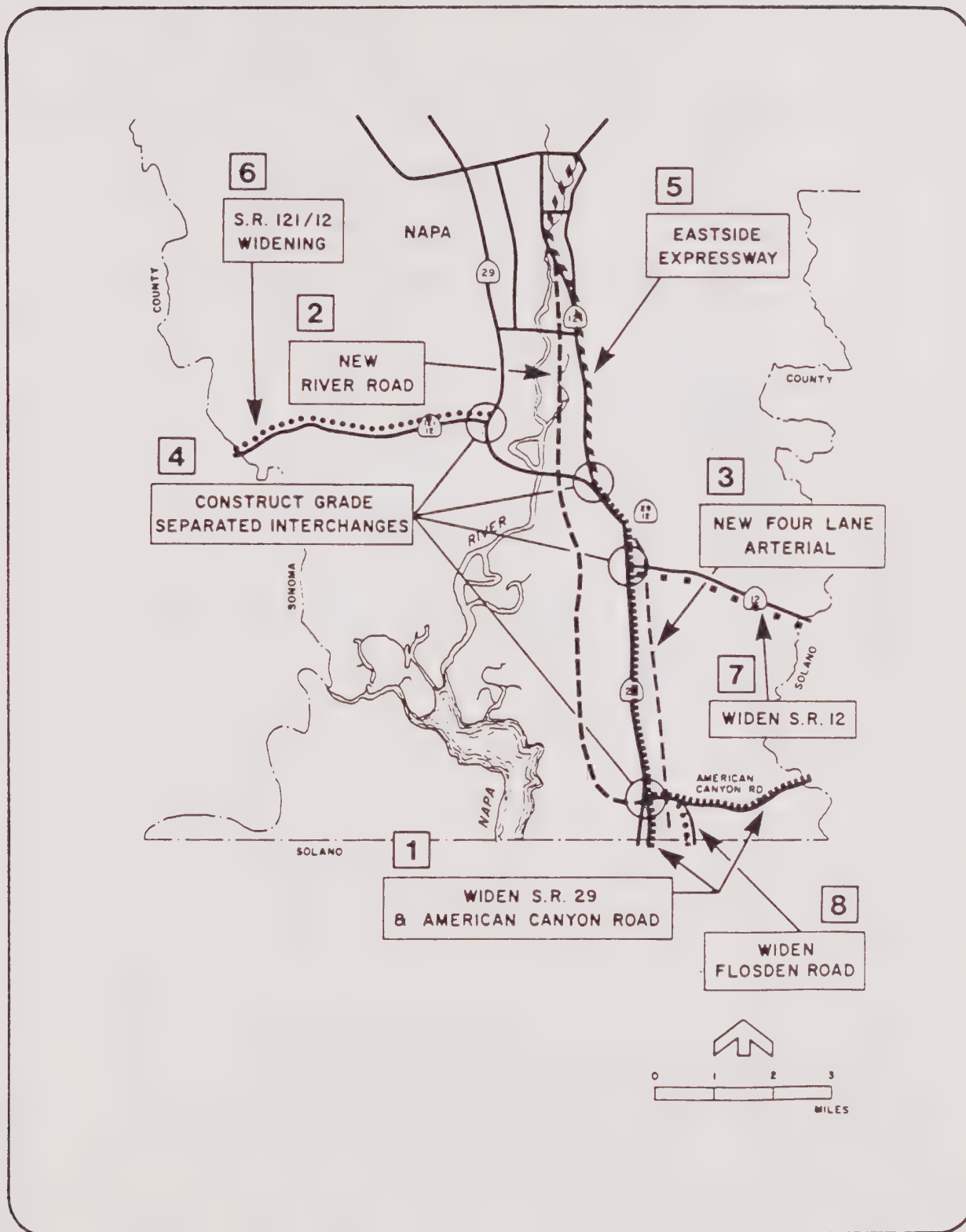
1. Napa Valley Bypass;
2. S.R. 29 Widening by Four Lanes -- Yountville to Calistoga which would Bypass St. Helena.
3. Soscol/Silverado Trail Corridor Improvements;
4. Transportation System Management (TSM) Alternative: S.R. 29 and Silverado Trail;
5. Southern County Alternatives, including:
 - (1) S.R. 29 and American Canyon Road Widening;

- (2) New River Road; to connect American Canyon Road and Soscol Avenue, running along the Napa River;
- (3) New Four Lane Arterial; to parallel S.R. 29 from Solano County north to a point north of S.R. 12;
- (4) Construct Grade Separated Interchanges at the intersections of S.R. 29 and American Canyon Road, S.R. 12, S.R. 221, and S.R. 121/12;
- (5) Eastside Expressway;
- (6) S.R. 121/12 Widening;
- (7) S.R. 12 Widening; and
- (8) Flosden Road Widening.

Impacts Assessment - The effects of the above alternatives would mostly involve capacity increases in existing travel corridors. Thus, the traffic impacts were measured by estimating the potential diversion of traffic from one route to another, or by comparing the capacity associated with the alternative with the year 2000 traffic volumes. The procedures used and results obtained are documented in Working Paper 2 of this study.

Figure 69 summarizes the assessment of potential impacts which may be associated with the 12 highway improvement alternatives.

FIGURE 68: SOUTHERN COUNTY HIGHWAY ALTERNATIVES



Source: Wilbur Smith & Associates

FIGURE 69: IMPACT ASSESSMENT: POTENTIAL HIGHWAY IMPROVEMENT ALTERNATIVES

HIGHWAY IMPROVEMENT ALTERNATIVES

SOUTHERN COUNTY NETWORK ALTERNATIVES

	1 Napa Valley Bypass	2 Widen S.R. 29	3 Soscol/Silverado Improvements	4 TSM Alternative	S-1 Widen S.R. 29/ American Canyon	S-2 River Road	S-3 Four-Lane Arterial	S-4 Grade Separate	S-5 Eastside Expressway	S-6 S.R.121/12 Widening	S-7 S.R.12 Widening	S-8 Floden Rd. Widening
POTENTIAL IMPACTS												
TRAFFIC												
Levels of Service	⊗	⊗	○	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
Traffic Diversion	⊗	○	○	○	○	⊗	⊗	○	⊗	○	○	○
New Traffic Generation	⊗	○	○	○	●	○	●	○	○	○	○	○
New Facility Traffic	●	○	○	○	●	●	●	○	●	○	○	○
GENERAL PUBLIC												
Safety	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
Cost to Taxpayer	●	●	○	○	●	●	●	●	●	●	●	●
BUSINESS, INDUSTRIAL DEVELOPMENT												
Goods Movement	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
Land Use	●	●	○	○	●	●	●	○	●	●	●	○
Current Highway Programs and Policies	●	●	⊗	⊗	⊗	●	●	⊗	●	●	●	○
LEGEND												
⊗ Positive Impacts	● Major Negative Impacts											
○ Low or No Impacts	● Minor Negative Impacts											

Note: As a point of reference, the County's current highway maintenance and safety betterments program would have impacts similar to those of Alternative 4 (TSM).

Source: Wilbur Smith & Associates

3. GOALS AND POLICIES

Goals and Policy Guidelines

This section presents general planning goals and supplementary policy guidelines for the following seven areas:

1. Circulation and Land Use;
2. State Highway Routes and County Roads;
3. Transit and Paratransit Services;
4. Air Transportation;
5. Rail Service;
6. Navigable Waterways; and
7. Nonmotorized Transportation.

The goals and guidelines were prepared following a thorough review of the existing and proposed County transportation system with respect to existing problem areas and issues, future travel characteristics, potential transportation system improvements, potential and overall County policies and community attitudes, as they relate to existing and proposed land uses in the County.

Circulation and Land Use Planning - The recognition of the interrelationships between land use and circulation necessitate a close interaction between circulation and land use planning efforts. The directly proportional transportation needs and impacts associated with growth must be addressed, to ensure a satisfactory balance of mobility and impacts. Accordingly, the following general planning goal is supplemented by policy guidelines which not only relate to changes in transportation system, but to land use patterns and policy as well.

Planning Goal 1: To develop a comprehensive circulation system coordinated with planned land uses as shown in the Land Use Element of the General Plan.

Policy Guidelines

- 1a. Mixed land use development proposals (i.e. residential and commercial) should be encouraged in urban areas to minimize trip generation requirements.
- 1b. The County should require that travel-related commercial services (i.e.

gasoline stations, restaurants and lodging facilities) along traffic arterials should be planned to avoid strip commercial development, in conjunction with the land use element. All associated transportation facilities should be planned in conjunction with the land use element.

- 1c. Create and enforce highway access standards regarding new driveways, including functional layout, location, and spacing, so as to minimize interference of major traffic flows by minor driveways. As discussed in Chapter 2, the County could specify that this issue be addressed, by developers and property owners, as a part of the normal plan approval and environmental impact process.
- 1d. The transportation system should minimize disruption to residential neighborhoods and communities.
- 1e. The County should follow a land use pattern with concentrated urban areas to facilitate effective public transit services.
- 1f. The transportation system should provide access to commercial and industrial areas, recreational facilities, and other major trip generators, as appropriate.
- 1g. Require that construction of transportation improvements are compatible with existing landforms and that landscaping is an integral part of the overall highway improvement program.

State Highway Routes and County Roads - The projected problem areas on the existing highway/roadway system highlighted in the previous chapter form the basis, and provided justification for the following general planning goal and specific policy guidelines.

Roadway improvements should be constructed using applicable city, county, or state highway design specifications. Suggestions from Chapter 2, accident history,

potential liability, unanticipated new development, and unanticipated changes in the region's economy should be considered during the implementation process.

Planning Goal 2: Improve the County roadway system, including State Highway Routes, County roads and local streets (under County jurisdiction), to provide satisfactory levels of service, safety, and convenience in person and goods movement, with respect to the Land Use Element of the Napa County General Plan. Such improvements should optimize the usefulness of the existing transportation system and be implemented in the most effective manner with respect to maintenance of environmental quality in Napa County.

Policy Guidelines

2a. Continue or commence planning and engineering activities to improve levels of service on the following critical links in the highway system. As levels of service increase, exposure to unsafe traffic conditions would decrease, therefore making the highway system safer for all concerned.

2a(1) S.R. 29, Yountville to St. Helena (widen to add left turn lanes). This improvement would increase peak hour capacity by about 5 to 10 percent, reduce year 2000 peak hour L.O.S. from "E/F" to "D," and increase average speeds.

2a(2) S.R. 29, from American Canyon Road to S.R. 12 (construct grade separated interchanges at S.R. 121/12, S.R. 121, S.R. 12, and American Canyon Road). These improvements would increase the capacity of S.R. 29 slightly (by about 5 to 10 percent), improve access to and egress from S.R. 29, improve average speeds, reduce congestion, and improve year 2000 peak hour L.O.S. from "D/E" to "D."

- 2a(3) American Canyon Road, from Interstate 80 to S.R. 29 (widen to four lanes). Peak hour capacity would be improved from approximately 900 vph (two-way) to 3,000 vph (peak direction) under this alternative, with a consequent improvement in year 2000 peak hour L.O.S. from "F" to "C."
- 2a(4) S.R. 121/12, Sonoma/Napa County line to S.R. 29 (widen to four lanes). This would increase peak hour capacity from approximately 1,900 vph (two way) to 3,200 vph (peak direction), thus improving year 2000 peak hour L.O.S. from "F" to "B."
- 2a(5) S.R. 12, Solano/Napa County Line to S.R. 29 (widen to four lanes). Peak hour capacity would be increased to 3,200 vph (peak direction) from 1,900 vph (two-way), thus improving year 2000 peak hour L.O.S. from "F" to "B/C."
- 2a(6) Flosden Road, south of American Canyon Road (extend four lane section to American Canyon Road). Peak hour capacity of this segment would be increased from 1,900 vph (two-way) to 3,200 vph (peak direction) with associated year 2000 peak hour L.O.S. improvement from "F" to "C."
- 2b. Consider adding additional capacity to S.R. 29 between American Canyon Road and the southern end of the Southern Crossing (from four to six lanes). Under this alternative, peak hour capacity of S.R. 29 would be increased from 3,400 vph to approximately 5,100 vph (peak direction, with associated year 2000 peak hour L.O.S. improvement from "D/E" to "B/C"; increased safety would result from reduced traffic congestion.
- 2c. Support continuing improvements to develop Soscol Avenue, in the City of Napa, as a major connection between

Imola Avenue and Trancas Street. This would improve convenience, safety and levels of service.

- 2d. Continue efforts to improve Silverado Trail between Trancas Street and S.R. 29 in Calistoga as a two lane arterial, consistent with applicable design standards for a two lane highway with a design speed of 45 miles per hour. The 45 miles per hour design speed is a County Transportation Planning Guideline. It should be considered a minimum to effect the greatest safety benefits. In conjunction with these improvements, continue to require highway improvements, such as separate left turn lanes where justified by projected or observed traffic generation at existing or new activity centers along Silverado Trail.
- 2e. Control the location, functional design, and spacing (relative to other roadways) of new driveways for new and expanding developments along S.R. 29 (Yountville to Calistoga) and Silverado Trail (north to Trancas Street) to optimize roadway capacity and minimize the interference caused by side vehicular and pedestrian traffic. As discussed in Chapter 2, as the level of the "strip commercial" development increases, along with its associated driveways (mostly unsignalized intersections), roadway capacity decreases. Therefore, the approval of new or expanded developments should continue to be contingent upon a proper analysis of potential impacts relating to the development, especially with respect to driveway location and spacing with respect to other driveways and crossing roadways. Said controls and assessments should not be limited only to S.R. 29 and Silverado Trail, but should be applicable to other local arterial roadways. It would be appropriate to implement such controls in concert with Policy Guidelines 2a and 2d, and with the Goals and Policies of the Land Use Element.

- 2f. Implement a program of highway signage to direct drivers to use the Silverado Trail to reach certain destinations, to remove traffic from the sensitive section of S.R. 29.
- 2g. In light of the projected increase in the use of existing County highways, continue to perform periodical inspections, preventive maintenance, safety betterments and repairs, to the fullest extent possible with existing and projected financial resources. Example: current projects included Petrified forest Road and Silverado Trail. To partially alleviate congestion and improve safety, the section of S.R. 29 north of Calistoga should be included in the DPW's current safety betterments program.

Transit and Paratransit Services - Although Napa County is currently served by a variety of transit and paratransit operators, there are opportunities to expand and improve transit services for the year 2000. This can be accomplished by planning transit service improvements for three distinct population subgroups; the transit dependent population, the commuter and recreational traveler.

Planning Goal 3: To encourage and support the development of local and regional transit services that effectively meet the needs of all segments of the population.

Policy Guidelines

- 3a. All public owned transit vehicles should be fully accessible and responsible to the needs of the elderly and handicapped population.
- 3b. Opportunities for coordinating the delivery of paratransit services should be maximized.
- 3c. The County should support efforts to coordinate schedules between the fixed route transit system in Napa and Greyhound Bus Lines, to improve intra-County and inter-County transit services.

- 3d. Expand the service coverage area for paratransit services operating in Napa County.
- 3e. Efforts should be made to link local transit services with transit systems in adjacent counties, to meet regional travel needs.
- 3f. The County and Cities should work cooperatively with interested wineries, local merchants and other private sector interests in evaluating opportunities for providing transit services to major recreational areas.
- 3g. To encourage transit and other forms of travel, the County and Cities should encourage developers to participate in transit improvements. Such improvements could provide justification for reducing the number of parking spaces provided for commercial and recreational/tourist oriented development projects.

Aviation - Napa County Airport will continue to serve as a general aviation facility and provide quarters for a large pilot training program.

Napa County Airport consists of three runways plus a system of interconnecting taxiways with approximately 180,000 takeoffs and landings recorded in 1981. By the year 2000, Napa County Airport is expected to increase its annual aircraft movements to 375,000, representing an increase of 108 percent. To accommodate this demand, Napa County Airport has plans to increase its runway capacity to 490,000 and install an Instrument Landing System (ILS) for one of its three runways. The Napa County Airport Master Plan also calls for additional storage facilities for the fixed wing aircraft stationed at the airport by the year 2000, and an increase of approximately 170 parking spaces to augment the existing parking facility.

The expansion plans for Napa County Airport will require 75 acres of land, immediately adjacent to the south side of the airport boundary. The planned industrial land uses to the east and agricultural and open space land use to the north and west are compatible with airport expansion plans.

Planning Goal 4: To maintain the Napa County Airport as a general aviation facility.

Policy Guidelines

- 4a. To enhance the safety at Napa County Airport and increase the runway capacity, an Instrument Landing System (ILS) should be installed.
- 4b. Additional aircraft storage facilities should be provided to accommodate the expected increase in aircraft movement.
- 4c. The surrounding land uses should be compatible with airport activity and consistent with Policy 1.1 (Airport Approach Zones of the Land Use Element of the General Plan.
- 4d. The County should implement approved recommendations from the Master Plan for Napa County Airport.

Rail Service - Napa County is presently served by the Southern Pacific Transportation Company (SPTC) which provides intercounty rail freight service with connections in Schelville with the Northwest Pacific Railroad.

The railroad currently provides freight service to 13 industries located in Napa County; eight in the City of Napa and five in St. Helena. The freight shipped from Napa County is primarily agricultural (including shipments from several wineries) with some industrial products. The majority of shipments are bound for destinations outside the County.

The future use of the railroad is dependent upon the demand created for freight service by existing industries as well as any major new industrial developments located near the railroad right-of-way. If there is an increased demand for service, an evaluation study would be taken by SPTC to determine the feasibility and potential economic benefits.

Planning Goal 5: To encourage the use of the existing rail- in Napa County for the transport of goods and products.

Policy Guidelines

- 5a. The County should support all efforts to maintain and upgrade trackage in Napa County.
- 5b. All rail lanes and rights-of-way should be reserved for future transportation needs.

- 5c. To maximize opportunities for rail freight service, industrial development which could be served by rail should be concentrated in American Canyon Area on sites accessible to the railroad.
- 5d. The County should monitor the availability of railroad lines. Abandoned rights-of-way should be considered for use as pedestrian and bicycle paths.

Waterway Transportation - The two major waterways in Napa County include Lake Berryessa, a man-made reservoir which serves as a domestic water supply reservoir, and Napa River, which flows into the San Francisco Bay. The lake is used for recreational purposes which the river functions as a recreational waterway as well as serving local industry.

Napa River flows throughout Napa County collecting run-off water from the hillsides in the Up Valley area. The river originates in the County and connects with coastal and other adjoining navigable waterways. Since the river was dredged in 1981, it can now accommodate barges up to 100 feet wide increasing the opportunity for industrial transportation on the river, particularly in the developing industrial American Canyon area.

Planning Goal 6: To support and encourage the use of the Napa River for the transport of industrial goods and products.

Policy Guidelines

- 6a. The County should support projects to improve clearance and water depths in the navigable reaches of the Napa River.
- 6b. The County should investigate new opportunities for travel on Napa River for recreational purposes and for the movement of goods.

Nonmotorized Transportation - Nonmotorized transportation includes bicycle and pedestrian travel. This form of travel is becoming an increasingly important element in the total transportation network as the cost of energy continues to rise and alternatives to the automobile are being explored. Inherent in this theory is the basic assumption that nonmotorized transportation facilities will be improved, offering the potential bicyclist or pedestrian a more attractive alternative to the automobile.

According to the Napa County Parks and Recreation Plan, the development of hiking trails and bicycle routes (utilizing existing public road rights-of-way) would eventually interconnect with all major recreational areas and result in an integrated system providing urban-rural continuity with several of the routes traversing the Napa Valley.

Planning Goal 7: To develop an integrated system of hiking paths and bicycle lanes where it is safe and financially feasible.

Policy Guidelines

- 7a. Hiking paths and bicycle lanes should be developed to meet both transportation and recreation needs. They should provide access to residential, employment, educational, commercial and recreation areas.
- 7b. Hiking paths and bicycle lanes should be integrated with nonmotorized transportation facilities in the incorporated cities of the County.
- 7c. To develop bicycle lanes and/or hiking trails the County should, where feasible, repave or widen shoulders when upgrading County roads and facilities.
- 7d. The development of bicycle lanes should be coordinated with the City of Vallejo Bikeway Master Plan, to facilitate inter-county bicycle travel on S.R. 29, Flosden Road and Elliott Drive.
- 7e. Design standards for the development, maintenance, and improvement of bicycle lanes should comply with the standards established by Section 2375 and 2376 of the Streets and Highway Code.

- 7f. A bicycle safety program for use in local schools and law enforcement agencies should be developed through a joint participation program including the County, Cities, and Unified School District.
- 7g. The County and Cities should continue providing bicycle storage and locking facilities near public buildings, and in parks and schools. Developers should be encouraged to provide such facilities in shopping and commercial areas. Bicycle parking should be provided free of charge. Funding sources such as bicycle license fees and meter revenues should be considered.
- 7h. Pedestrian and bicycle access should be integrated into all parking lots and considered in the evaluation of development proposals and public projects.

4. IMPLEMENTATION PLAN

The proposed goals and policy guidelines presented in the previous chapter were synthesized into a recommended Implementation Plan.

Figure 70 presents the recommended improvement program for Napa County through the year 2000 planning horizon. For each general travel mode, policy guidelines are presented along with preliminary estimates of implementation phasing and responsibilities, and estimates of relative costs. Three implementation periods are included (short, middle, and long term).

Figures 71 and 72 depict the generalized recommended highway improvement plan for the County. Figure 73 illustrates the transit and paratransit plan, and Figure 74 presents the plan for nonmotorized transportation.

FIGURE 70: TRANSPORTATION SYSTEM IMPROVEMENT PROGRAM

<u>MODE</u>	<u>Short Term</u> (1982-1987)	<u>Middle Term</u> (1988-1992)	<u>Long Term</u> (1993-2000)	<u>IMPLEMENTOR</u>	<u>RELATIVE COST</u>
Highway					
Improve Levels of Service on				Napa County:	
- S.R. 29 (Yountville to St. Helena left turn lanes)	Prepare Construction Documents and EIR	Construct Improvements	-	• Board of Supervisors	Medium
- S.R. 29 (Grade separate American Canyon Road, S.R. 12, S.R. 221, S.R.121/12 intersections).	Prepare preliminary concept plans, estimate costs	Prepare Final Construction Documents and EIR	Construct Improvements	• Dept. of Public Works (DPW)	High
- American Canyon Road (I-80 to S.R. 29 - widen)	Prepare preliminary plans, estimate costs, prepare EIR	Prepare Final Construction Documents	Construct Improvements	• Conservation, Development and Planning Department (CDPD)	Medium
- S.R. 121/12 Widening	Prepare preliminary concept plans, estimate costs	Prepare Final Construction Documents and EIR	Construct Improvements	• Conservation, Development and Planning Commission (CDPC)	Medium
- S.R. 12 Widening	Same as above	Same as above	Same as above	CalTrans Local Communities FHWA	Medium
- Floden Road Widening	Same as above	Same as above	Same as above	Same as above	Low
Consider Adding Capacity to S.R. 29 (American Canyon Road to Southern Crossing)	Conduct Impact Analysis, Feasibility Study	(If feasible) Prepare Preliminary Concept Plans, EIR	(If feasible) Prepare Final Construction Plans	CalTrans, DPW, CDPD, CDPC, Board of Supervisors, Local Communities	High
Continue Soscol Avenue Improvements	Ongoing	Ongoing	Ongoing	City of Napa: Department of Public Works, Planning Department	Low
Continue to improve Silverado Trail	Ongoing	Ongoing	Ongoing	DPW, CDPD, CDPC, Board of Supervisors	Low
Develop and institute driveway policies	Conduct planning study, impacts analysis; seek required approvals; institute policies	-	-	CDPD, DPW, CDPC, Board of Supervisors, CalTrans	Low
Implement Highway Signage Program	Conduct planning study, impacts analysis; gather approvals, employment program	-	-	CDPD, CDPC, DPW, Board of Supervisors, CalTrans	Low
Continue periodic, routine maintenance improvement of county roadways and general safety betterments and shoulder widenings.	Ongoing	Ongoing	Ongoing	DPW, CalTrans	Low

(Continued)

FIGURE 70 (Continued)

<u>MODE</u>	<u>Short Term</u> (1982-1987)	<u>Middle Term</u> (1988-1992)	<u>Long Term</u> (1993-2000)	<u>IMPLEMENTOR</u>	<u>RELATIVE COST</u>
Transit and Paratransit Services	Develop strategy for coordinating and expanding paratransit services	Reevaluate the effectiveness and efficiency of paratransit services	Reevaluate the effectiveness and efficiency of paratransit services	Social Service Transportation Agencies, Consolidated Transportation Service Agency (CTSA) and DPW	Low
	Work cooperatively with educational institutions and major employers in developing ridesharing programs, flexible working hours and special shuttle service	Ongoing	Ongoing	DPW, CalTrans, RIDES for Bay Area Commuters and various private transit operators	Low
	Evaluate market potential for park-and-ride services, coordinated tourist charters and other innovative transit strategies to serve the recreational traveler	(If warranted) Develop transportation plan designed to serve the recreational traveler		DPW, private charter services, and various wineries	Low
	Require that the design of new development projects facilitate nonmotorized transportation travel and encourage public transit usage	Ongoing	Ongoing	CDPD, DPW, CDPC, Board of Supervisors	Low
Air Transportation	Install Instrument Landing System (ILS)			Napa County Airport, Board of Supervisors, Metropolitan Transportation Commission (MTC), Association of Bay Area Governments (ABAG) and Federal Aviation Administration (FAA).	Medium
Air Transportation (cont'd)		Provide 280 additional aircraft parking spaces		Napa County Airport, MTC and ABAG	Low
			Provide 380 additional aircraft parking spaces	Napa County Airport, MTC and ABAG	Medium
Rail Service	Determine feasibility of improving rail freight service to American Canyon Area and north of Napa	(If feasible) Prepare preliminary plans	(If feasible) Implement additional service	DPW, Southern Pacific Transportation Company (SPTC) and various private industries	Medium
	Provide proper zoning to ensure that abandoned rights-of-way can be used for nonmotorized transportation facilities			CDPD, DPW, CDPC, and Board of Supervisors	Low

(Continued)

FIGURE 70 (Continued)

<u>MODE</u>	<u>Short Term</u> (1982-1987)	<u>Middle Term</u> (1988-1992)	<u>Long Term</u> (1993-2000)	<u>IMPLEMENTOR</u>	<u>RELATIVE COST</u>
Waterway Transportation		Evaluate feasibility and potential benefits in improving navigable capabilities of Napa River		DPW, California State Department of Boating and Waterways, and various private industries	Low
			Work cooperatively with appropriate agencies in developing strategies for improving navigable capabilities of Napa River	DPW, California State Department of Boating and Waterways, and various private industries	Low
Nonmotorized Transportation	Incorporate nonmotorized transportation facilities (hiking paths and bicycle routes) into circulation plan and development projects. Provide bicycle storage facilities near appropriate public buildings			CDPD, CDPC, DPW, and Board of Supervisors	Low
Nonmotorized Transportation (cont'd)		Provide information to the public on the location of hiking paths and bicycle routes and implement a bicycle safety program		CDPD, DPW, Public Schools and Law Enforcement Agencies	Low
			Ensure that all designated hiking paths and bicycle routes have been implemented. Evaluate effectiveness of bicycle safety program	CDPD, DPW, and Law Enforcement Agencies	Low
1) High:	Over \$5,000,000 total project cost (1982 Dollars)				
Medium:	\$1,000,000 to \$5,000,000 total project cost (1982 Dollars)				
Low:	Below \$1,000,000 total project cost (1982 Dollars)				

Source: Wilbur Smith & Associates

[illegible]

FIGURE 72: HIGHWAY IMPROVEMENT PLAN FOR SOUTHERN COUNTY 1983-2000

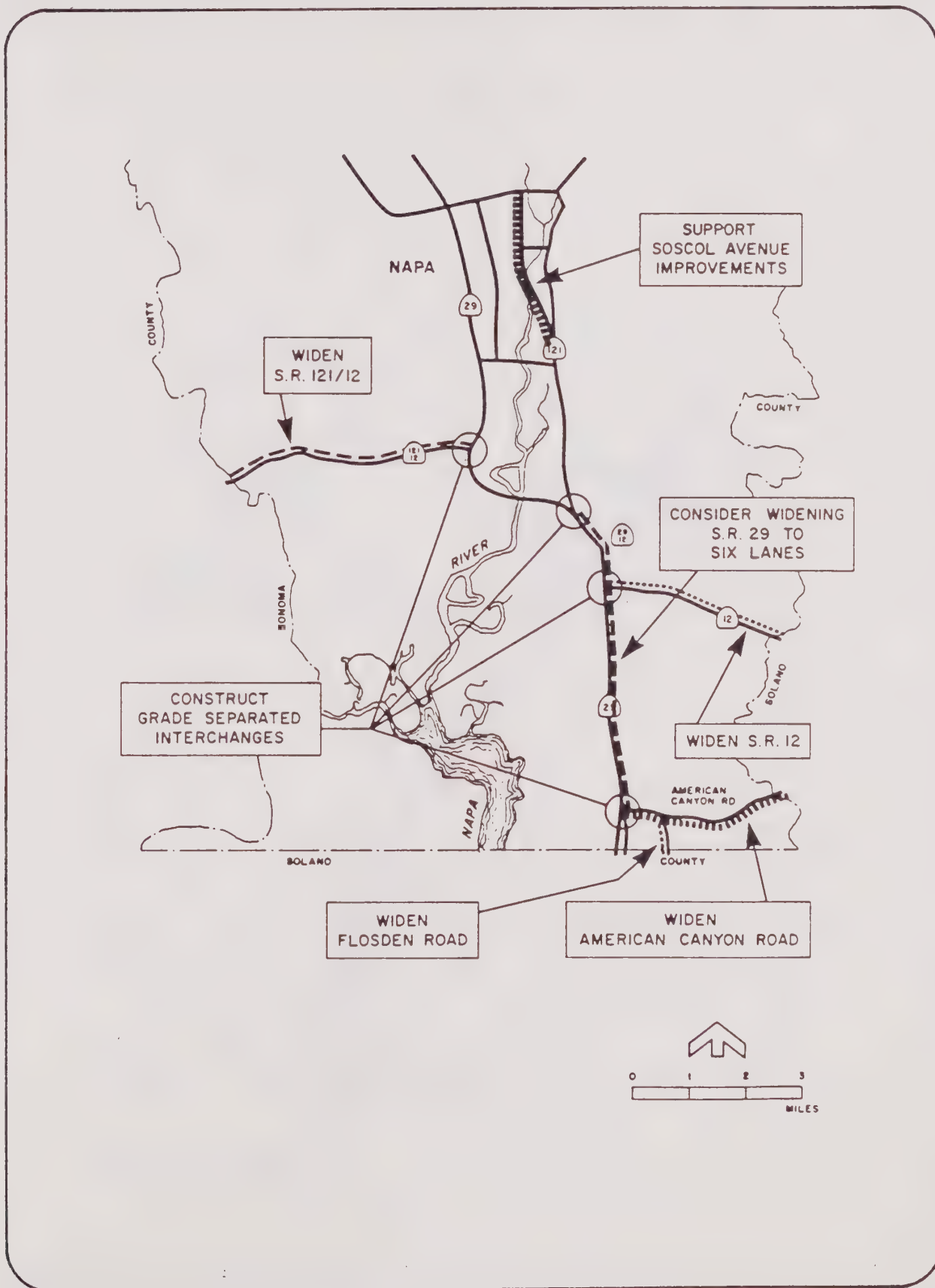


FIGURE 73: TRANSIT AND PARATRANSIT PLAN

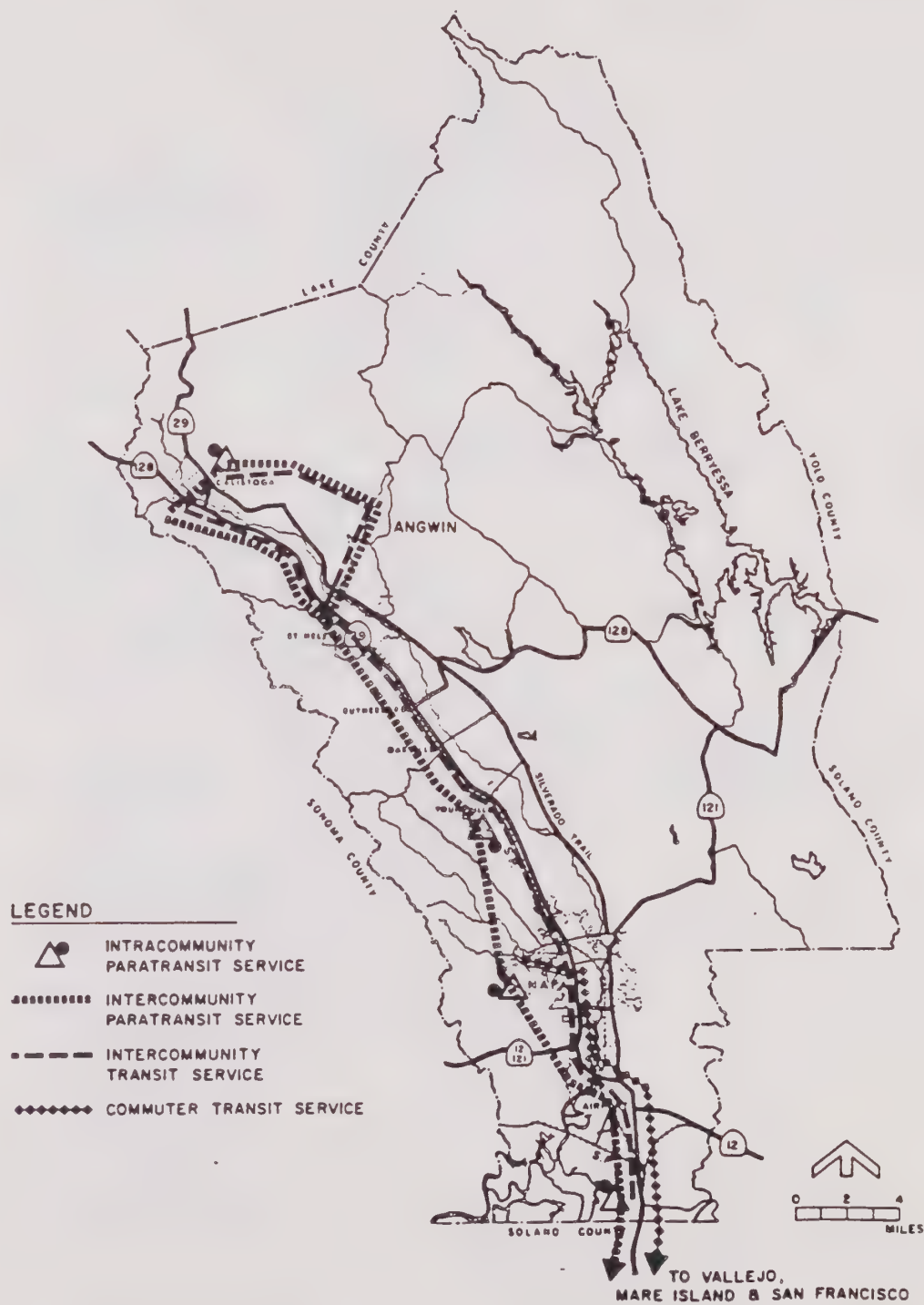
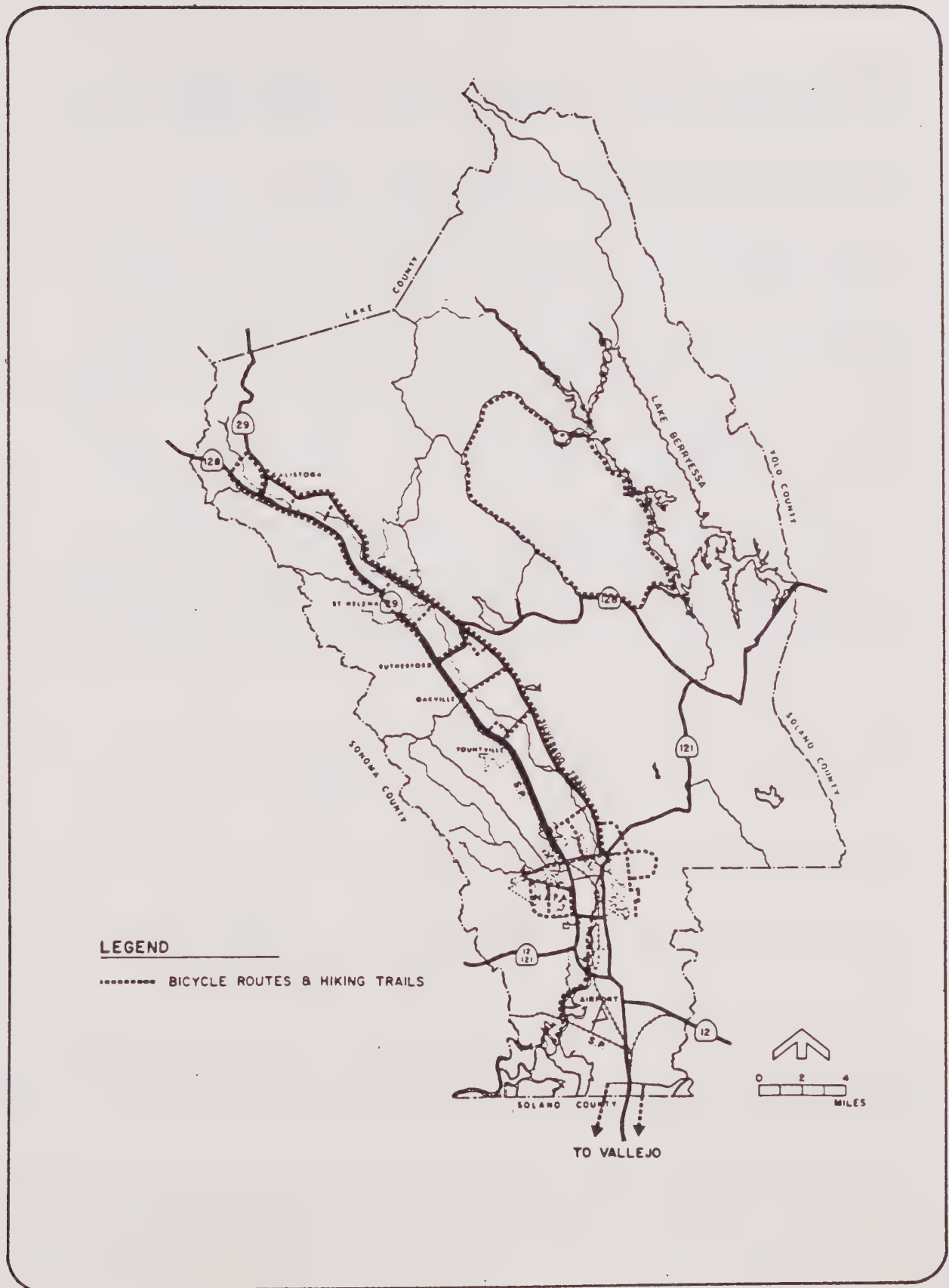


FIGURE 74: NONMOTORIZED TRANSPORTATION PLAN



5. APPENDIX

APPENDIX A: GLOSSARY

Accessible Transportation - Refers to transportation facilities which have no barriers preventing their use by all travelers.

Average Daily Traffic (ADT) - The total volume of traffic crossing a fixed point over a 24-hour period.

Airport Capacity - The movement rate of aircraft which results in an acceptable delay to operations.

Balanced Transportation System - A transportation system that integrates land use planning and transportation planning and approaches a realistic balance among all transportation modes.

Commuter Service - Transportation provided on a regularly scheduled basis, typically for the purpose of travel to and from work or school each day.

Controlled Access Highways - A highway which gives preference to through traffic by providing access connections with selected public roads only by prohibiting crossings at grade or direct private driveway connections. Analogous to the more common term, private driveway connections. Analogous to the more common term, "freeway." A highway with partial control of access has the same characteristics but allows some intersection at grade.

Demand - Responsive Transportation - A mode of transportation designed to carry passengers from their origins to specific destinations upon request.

Design Speed - The maximum safe speed that can be maintained over a specific segment of a roadway.

Express Service - Transit service that is designed to make a limited number of stops between relatively long distances along a given route.

Fixed Route Service - A regularly scheduled bus service operating over an established route.

General Aviation - Refers to all civic aircraft activity other than commercial aviation.

Level of Service (LOS) - A technique for expressing the quality of traffic on any type of roadway. These levels of service, A through F, from best to worse respectively, cover the entire range of traffic conditions. (See Volume/Capacity Ratio).

Modal Split - A division of trip-making among different kinds of transportation.

Multi Lane Rural Highway - A roadway segment with no, or limited, access control which has more than two lanes. This kind of roadway may or may not include directional division by means of a barrier or median strip.

Paratransit - Flexible transportation services operated either publicly or privately, serving special transit needs.

Peak Periods - Specific time periods (i.e. time of day or certain season of the year) during which there is a maximum volume of traffic on the roadway.

Ride Sharing - A group of people who share the cost of regular automobile transportation (or by van) to and from a designated destination.

Transit Dependent - Refers to persons who have no independent means of transportation, primarily because of their age, income or physical disability.

Transportation System Management (TSM) - A transportation management strategy which emphasizes increased efficiency of existing transportation facilities. The steps or actions taken are generally low cost measures and relatively easy to implement.

Trip - One-way movement, expressed in persons or vehicles between an origin and destination.

Trip Generation - A determination of the quantity of trip ends associated with a zone or parcel of land.

Trip Assignment - The allocation of traffic along routes available between any two points.

Two-Lane Rural Highway - A highway which has, for the majority of its length, only two lanes. Depending on the topography traversed, climbing or passing lanes may be included.

Volume/Capacity Ratio (V/C Ratio) - The ratio of volume of traffic to capacity for a given roadway. The V/C ratios are useful to estimate levels of service and congestion.

APPENDIX B: BIBLIOGRAPHY AND PERSONS CONTACTED

Bibliography

Alan Voorhees, Napa County Balanced Transportation Study,
December, 1973.

August W. Compton and Associates, Master Plan: Napa County
Airport, June, 1976.

California Department of Transportation, Planning and Design
Criteria for Bikeways in California, June 30, 1978.

California Office of Planning and Research, The Scenic Route:
A Guide for the Official Designation of Scenic Highways,
July, 1979.

City of Napa Public Works Department, Report and Recommenda-
tions for Master Street Improvement Program 1981-2000,
October 26, 1981.

Dave Consulting, Inc., Napa County Transportation Development
Plan, FY 1981-1985.

DKS Associates, Napa Circulation Study, Draft Final Report,
December 31, 1981.

DKS Associates, Solano County Transportation Plan Update,
1982.

Grumwald Crawford Associates, Napa County's Park and Recrea-
tion Plan, February, 1976.

Highway Research Board, Highway Capacity Manual, Washington,
D.C., 1965.

Metropolitan Transportation Commission and Association of Bay
Area Governments, Regional Airport Plan, April, 1980.

Metropolitan Transportation Commission, 1982-83 Regional
Transportation Improvement Program, May 26, 1982.

Metropolitan Transportation Commission, Bay Area Street and
Road Maintenance Needs; Summary Report, March, 1982.

Napa County Conservation Development and Planning Department,
American Canyon Incorporated EIR, 1981.

Napa County Conservation, Development and Planning Department,
Conservation and Open Space Element, Napa County General
Plan, June, 1973.

Napa County Conservation, Development and Planning Department,
Growth Management System - Interim Element, Napa County
General Plan, August, 1981.

Napa County Conservation, Development and Planning Department,
Housing Element, Napa County General Plan, April, 1979.

Napa County Conservation, Development and Planning Department,
Land Use Element, Napa County General Plan, June, 1982.

Napa County Department of Public Works, Status of the Appraisal
Study of Transit Access to the Wine Country, April, 1976

Napa Valley Vintners, 1978 Traffic Study, April, 1979.

Mendocino County Planning Department, Circulation Element of
the General Plan, September 24, 1981.

Sedway/Cooke, Lake County General Plan Program, Working Paper
#5, Circulation and Scenic Highways, January, 1981.

Vallejo Planning Department, Land Use and Circulation Element
of the General Plan (Draft), March, 1980.

Persons Contacted

Barreras, Santos, Transportation Engineer, California Department of Transportation, District 4, San Francisco, California.

Derr, Ken, Southern Pacific Transportation Company staff, San Francisco, California.

Joell, Mike, Contract Planner, City of Calistoga, California.

Klein, Bern, Special Projects Engineer, Napa County Department of Public Works, Napa, California.

Lampert, Lynn, Transit Coordinator, Napa County Department of Public Works, Napa, California.

Lander, Jon Engineer, Town of Yountville, California.

Loveland, Jim, Southern Pacific Transportation Company staff, San Francisco, California.

McClimans, Tony, Senior Planner, Napa County Conservation, Development and Planning Department, Napa, California.

Musso, George, City Planner, City of St. Helena, California.

O'Loughlin, James, Senior Planner, Napa County Conservation, Development and Planning Department, Napa, California.

Richardson, Laverne, Secretary to Director of Aviation, Napa County, Napa, California.

Roberto, John, Contract Planner, City of Yountville, California.

Selleck, William, Lafcom Analyst, Napa County Local Agency Formation Commission, Napa, California.

Sepee, Robert, Planner, California State Department of Boating and Waterways, Sacramento, California.

Torres, Mary, Planner, Volunteer Center of Napa County, Napa, California.

Ulriksen, Sidney, Transportation Engineer, California Department of Transportation, District 4, San Francisco, California.

Footnotes

/1/ Wilbur Smith and Associates, estimated from CalTrans vehicle counts.

/2/ Highway Research Board, Highway Capacity Manual, 1965

SCENIC HIGHWAYS



GENERAL PLAN

SCENIC HIGHWAYS ELEMENT

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	207
2. Selection Evaluation and Designation of Scenic Highways	207
3. Goal and Policies	211

FIGURES

75. Candidates for Scenic Highway Designation	208
76. Criteria for Evaluating Candidates for Official Scenic Highway Designation	209

1. INTRODUCTION

In Napa County many highways traverse areas of natural scenic beauty and recreational interest. These State Highway Routes and County Roads pass through the vineyards in the Napa Valley, wind through several steep and forested hills and provide access to numerous wineries, historical landmarks, State parks and Lake Berryessa. These routes provide residents and visitors an enjoyable travel experience.

The various landscapes and scenic corridors are a great natural resource and must be protected for future generations. Preservation of these scenic highways offer unique opportunities to the increasing number of Californians who live and work in urban areas. While they may provide economic benefits to Napa County residents as a result of tourism and sightseeing made possible by attractive roadways, they can also add costs for road maintenance and improvements to accommodate tourism.

2. SELECTION, EVALUATION AND DESIGNATION OF SCENIC HIGHWAYS

One method of preserving scenic corridors for future generations is through the official designation of scenic highways. A series of ten rural roadways of medium and high capacity in Napa County were selected for their significant aesthetic character and outstanding recreational driving opportunities. These corridors are depicted in Figure 75.

The criteria used to evaluate these roadways for inclusion in the Scenic-Highways system are discussed below.

Quality - The highway (or road) must traverse areas of high aesthetic, cultural and/or historic value and provide the user (of the highway) with an outstanding travel experience.

Accessibility - The highway should provide access to, or links between, existing or proposed parks or other public recreation areas, or points of scenic, cultural and/or historic interest.

Safety - The highway should be able to accommodate the anticipated volume of traffic without creating hazards or inconvenience to other highway users. Consideration should also be given to the safety of the resident population in the immediate surrounding area.

Adaptability to Development - The immediate roadside should be relatively free of commercial or restrictive development. Proposed development within the corridor which would not complement the character of the corridor should be recognized and considered in the evaluation process.

FIGURE 75: CANDIDATES FOR SCENIC HIGHWAY DESIGNATION

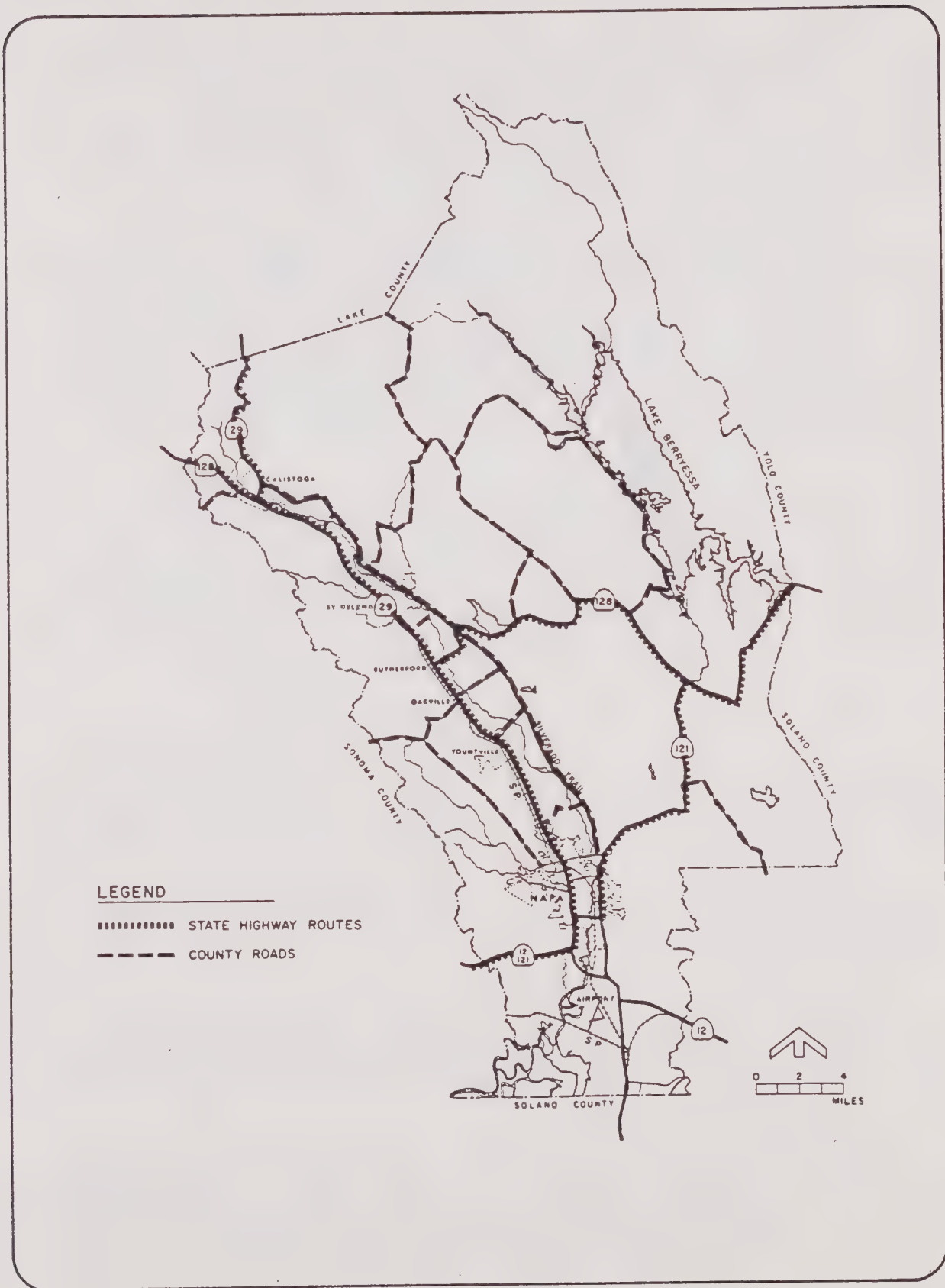


FIGURE 76: CRITERIA FOR EVALUATING CANDIDATE FOR OFFICIAL SCENIC HIGH DESIGNATION

CRITERIA FOR EVALUATING CANDIDATES FOR OFFICIAL SCENIC HIGHWAY DESIGNATION

COUNTY ROADS	EXTENT TO WHICH HIGHWAY MEETS CRITERIA				
	QUALITY	ACCESSIBILITY	SAFETY	ADAPTABILITY TO DEVELOPMENT	COMPATABILITY
Silverado Trail	●	●	○	○	●
Dry Creek Road - Oakville Grade	●	●	○	●	●
Petrified Forest Road	●	●	○	○	○
Deer Creek Road and Howell Mtn. Road (from St. Helena to Pope Valley Rd)	●	●	○	○	○
Butts Canyon, Pope Valley and Chiles Valley Roads	●	○	●	●	○
Pope Canyon Road	●	●	●	○	○
Wooden Valley Road	●	●	○	○	○
Berryessa Knoxville Road	●	●	○	○	○
Oakknoll Avenue	●	●	●	○	○
Yountville Cross Road	●	●	●	○	○
Zinfandel Lane	●	●	●	●	●
Lodi Lane	●	●	●	●	●
Bale Lane	●	●	●	●	●
<u>STATE HIGHWAY ROUTES (S.R.)</u>					
S.R. 128 (from Rutherford to Monticello Dam)	●	●	●	●	●
S. R. 29 (from Napa to Lake County Line)	●	●	○	○	●
S. R. 121 (from Sonoma County to Napa; from Napa to S.R. 128)	●	●	○	○	●
<u>LEGEND</u>					
●	Excellent				
○	Good				
○	Fair				
○	Poor				

6/7/83

209

Compatibility - The highway should be compatible and coordinated with other recreation and aesthetic objectives. The resulting traffic on the highway should not disrupt wildlife or agricultural lands, nor should it jeopardize the maintenance or enjoyment of open space areas or areas of cultural or historic interest.

These criteria have been applied to the Scenic Highway designations and are shown in Figure 76. As indicated, all the selected State Highway Routes are of excellent quality and meet the eligibility requirements for official Scenic Highway Designation.

State Designation of Scenic Highways

In order for an eligible route (State highway or County road) to become officially designated as a scenic highway, Napa County must first request the California Department of Transportation (CALTRANS) to perform a corridor study of the eligible route. Following completion of the corridor study, which will contain descriptions of the suggested scenic highway corridor boundaries, /1/ the relationship of the roadway to its surrounding environment, proposed alignments of the routes and potential locations of roadside rests, the County must prepare a specific plan for the protection of the scenic corridor. In accordance with the Office of Planning and Research (OPR) guidelines, /2/ the plan must include the following elements:

1. Guidelines for land use which may include density and/or intensity of development;
2. Detailed land and site planning;
3. Control of outdoor advertising;
4. Careful attention to control of earthmoving and landscaping; and
5. The design and appearance of structures and equipment.

If the plan is accepted by the Scenic Highway Committee, the corridor becomes officially designated and a "California poppy" sign is posted along the route and identified accordingly in official State Highway maps.

Participation in the California Scenic Highway Program would obligate the County to certain actions and expenditures of funds. At the same time the statewide program does not offer any incentives or other direct benefits to the County.

The State Scenic Highway Designation for a given highway can only be received after a plan for maintaining or improving the scenic quality is prepared by an outside agency, CalTrans. The County is then obligated to make the planned improvements. There is no meaningful way to estimate the potential costs associated with these improvements until actual plans are prepared and accepted by the state. Typical improvements include provision of route signing, provision of scenic turnouts, undergrounding of utilities; and removal of embankments, structures, or other features which impair scenic quality. The actual costs of these projects would vary significantly with location. For example, signage could cost less than \$1,000 per mile, but turnout construction could cost anywhere from \$50,000 to \$500,000.

Under present circumstances, Napa County chooses not to participate in the California Scenic Highway Program and, instead, adopts the following planning goal and policies to monitor the County designated scenic highway system in Napa County. Should the County elect to implement any of the recommended policies identified in this element (i.e. placement of utilities underground, development of roadside rests and replanting of trees and shrubbery), Napa County would incur additional costs; however, the County is under no financial obligation. If any of the scenic corridors were officially designated it is anticipated that it would involve additional costs to the County. The recommended program would allow the County the flexibility to participate in the State program at a later date as well as continue its commitment to the maintenance and preservation of the natural scenic environment.

3. PLANNING GOAL AND POLICIES

The planning goal and policy guidelines discussed in the following section will assist Napa County in preserving its scenic corridors and vistas.

Planning Goal: To provide for the protection of the scenic highway system through prevention maintenance and risk management programs, to ensure that public facilities are safe for public use and enjoyment.

Policies

1. The development of hike trails and bicycle lanes should be coordinated, when possible with scenic highway corridors.

2. Existing trees and shrubbery located outside the right-of-way and adjacent to scenic corridors should be preserved.
3. New development projects located within view of a scenic corridor should be subject to site and design review to ensure such development does not destroy the scenic quality.
4. Billboards located on scenic corridors should have height and bulk limitations and be limited in number.
5. Opportunities should be explored for joint public/private participation in developing locations for roadside rests, picnic areas and vista points.
6. Access and commercial development along scenic highways should be limited to prevent strip commercial development.
7. On scenic corridors, utilities should be placed underground, where possible, and utility poles, located outside the right-of-way should be camouflaged with the planting of trees and shrubbery.
8. Environmental assessment should evaluate if a scenic corridor or viewshed would be impacted and if warranted, mitigations should be developed.
9. A program to replant trees and shrubbery should be implemented in cases where they are removed during new roadway alignment.

Footnotes

- /1/ The corridor is defined as the area of land generally adjacent to and visible from the highway which requires protective measures to insure perpetuation of its scenic qualities.
- /2/ Office of Planning and Research (OPR), The Scenic Route: A Guide for the Official Designation of Scenic Highways. July, 1979.

CONSERVATION & OPEN SPACE



GENERAL PLAN

CONSERVATION AND OPEN SPACE ELEMENT

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	213
2. Goals and Policies	214
I. Preservation of Natural Resources	214
II. Managed Production of Resources	224
III. Outdoor Recreation	235
IV. Public Health and Safety	237
3. Open Space Action Program	245
4. Appendix	247

FIGURES

77. Wildlife Habitat Types and Acreage	214
78. Planning Areas	217
79. Coniferous Timber	221
80. Agricultural Lands	228
81. Agricultural Preserves	229
82. Mineral Deposit Lands	233
83. Potential County-Wide Significance of Open Space Land Categories	246

1. INTRODUCTION

The contents of the Conservation Element - Water and its Hydraulic Force, forests, soils, rivers and other waters, harbors, fisheries, wildlife, minerals and other natural resources are included in the Open Space Element. The resulting combined format provides a comprehensive set of Open Space and Conservation Policies and Guidelines which, for the purpose of clarity, are covered in four categories.

1. Preservation of natural resources deals with conservation and open space for purposes of wildlife and fishery habitat, rivers, streams, bays, estuaries, lakeshores, banks of rivers and streams, harbors, watershed land and areas required for ecological and other scientific study purposes.
2. Managed production of resources deals with the preservation and use of natural resources needed by industry and a continuing review of technological changes in resource demand and supply and environmental considerations, forest-lands, range-lands, agricultural-lands, water resources and mineral deposits.
3. Outdoor recreation deals with the use of national public domain lands, State parks, city and County recreation areas, hunting, fishing, swimming, boating, sightseeing, wildlife refuges and other recreation areas.

Included in outdoor recreation are areas of outstanding scenic, historical and cultural values. Land use of these purposes is concerned with preservation of attractive and appealing features in the natural and man-made landscape. These features might include the preservation of historical and architectural landmarks such as bridges and buildings made of local volcanic rock. These buildings give the County a distinctive architectural identity. It also is concerned with the potential adverse visual impact of solid waste disposal sites, auto wrecking, surface mines, signs, utility lines, etc.

- 4) Public health and safety deals with the preservation of clean air, pure water and productive soil. Since neither air nor water pollution respects political boundary lines, these problems are area-wide or regional in nature. However, the rapid deterioration of the quality of our air, water and soil is focusing the attention of all levels of government on public health and safety. Areas which require special management or regulation because of hazardous or special conditions such as earthquake fault zones, unstable soil areas, flood plains, watersheds and high fire risk areas should be considered only for limited uses that are compatible with established health and safety requirements.

2. GOALS AND POLICIES FOR NAPA COUNTY

The following goals and policies are directed toward the development of a sound and continuing conservation and open space program in Napa County. While the goals are very general in nature, they identify a general direction of effort required to realize a continuing program on a long-term basis. Policies by comparison are more readily obtainable and are intended to identify specific items of courses of action.

I. OPEN SPACE FOR PRESERVATION OF NATURAL RESOURCES

A. Wildlife and Fishery Habitat Areas

1. Definition: Land or water area designated on the State or any regional or local Open Space Plan as open space land which is unusually valuable or necessary to the preservation or enhancement of the wildlife resources of the County of the region.
2. Planning Goal: To conserve and improve wildlife and fishery habitat in cooperation with governmental agencies, private associations and individuals in Napa County.
3. Wildlife Habitat Quantity

FIGURE 77: WILDLIFE HABITATS AND ACREAGE

<u>Habitat Types</u>	<u>1967 Acreage</u>	<u>Percent of Napa County Total</u>
Woodland-Grass	158,350	31.0
Chaparral	131,200	25.5
Agriculture	47,690	9.3
Hardwood	47,000	9.2
Woodland-Chaparral	45,000	8.8
Lakes, Bays and Reservoirs	29,755	5.8
Urban-Industrial	20,025	3.9
Grassland	15,960	3.1
Coastal Forest	9,000	1.7
Barren	3,400	.7
Minor Conifer	3,000	.6
Marsh	2,000	.4
Riparian	200	TRACE
TOTAL	512,580	100%

SOURCE: Soil Conservation Service and Conservation,
Development and Planning Department

4. Wildlife Habitat Location

- (a) Planning areas with substantial areas of prime significance such as marshlands, riparian (stream side) woodlands, and oak woodlands or undeveloped areas are:

- 1) Napa River Delta, Carneros;
- 2) Curry, Suisun, Madigan;
- 3) Hennessey;
- 4) Pope Valley;
- 5) Kimball, Bell, Schwartz;
- 6) Napa Valley;
- 7) Berryessa.

- (b) Areas with significant, but not prime wildlife habitat are:

- 1) Napa S.E.;
- 2) Dry Creek;
- 3) American Canyon;
- 4) Milliken - Rector;
- 5) Knoxville;
- 6) York, West Calistoga Uplands;
- 7) West St. Helena Uplands.

- (c) Specific wildlife habitats of critical concern identified by the State are Napa marshes for important marshland habitat for waterfowl and water-associated wildlife. Rare wildlife species located in the Napa River Marshes are the California Clapper Rail, Black Rail, Salt-Marsh Harvest Mouse and Peregrine Falcon.

- (d) According to the Department of Fish and Game, the Napa River riparian woodlands are third most important for game habitat in Region 3, exceeded only by the Russian and Salinas Rivers which exceed the Napa River in length and quantity of vegetation but probably not in quality of vegetation.

5. Fishery Habitat Location

- (a) Planning areas with substantial fishery habitat in the form of Class 1 spawning streams and lakes based on findings of the Department of Fish and Game are:

- 1) Napa River Delta, Carneros;
- 2) Napa Valley;

- 3) Milliken - Rector;
- 4) Hennessey;
- 5) Berryessa;
- 6) York, West Calistoga Uplands;
- 7) West St. Helena Uplands;
- 8) Pope Valley.

(b) Planning areas with significant but not prime habitat fishery habitat are:

- 1) American Canyon;
- 2) Napa S.E.;
- 3) Dry Creek;
- 4) Curry, Madigan, Suisun;
- 5) Kimball, Bell, Schwartz.

(c) The Knoxville Planning Area has little or no significance for game fishery habitat because of warm water.

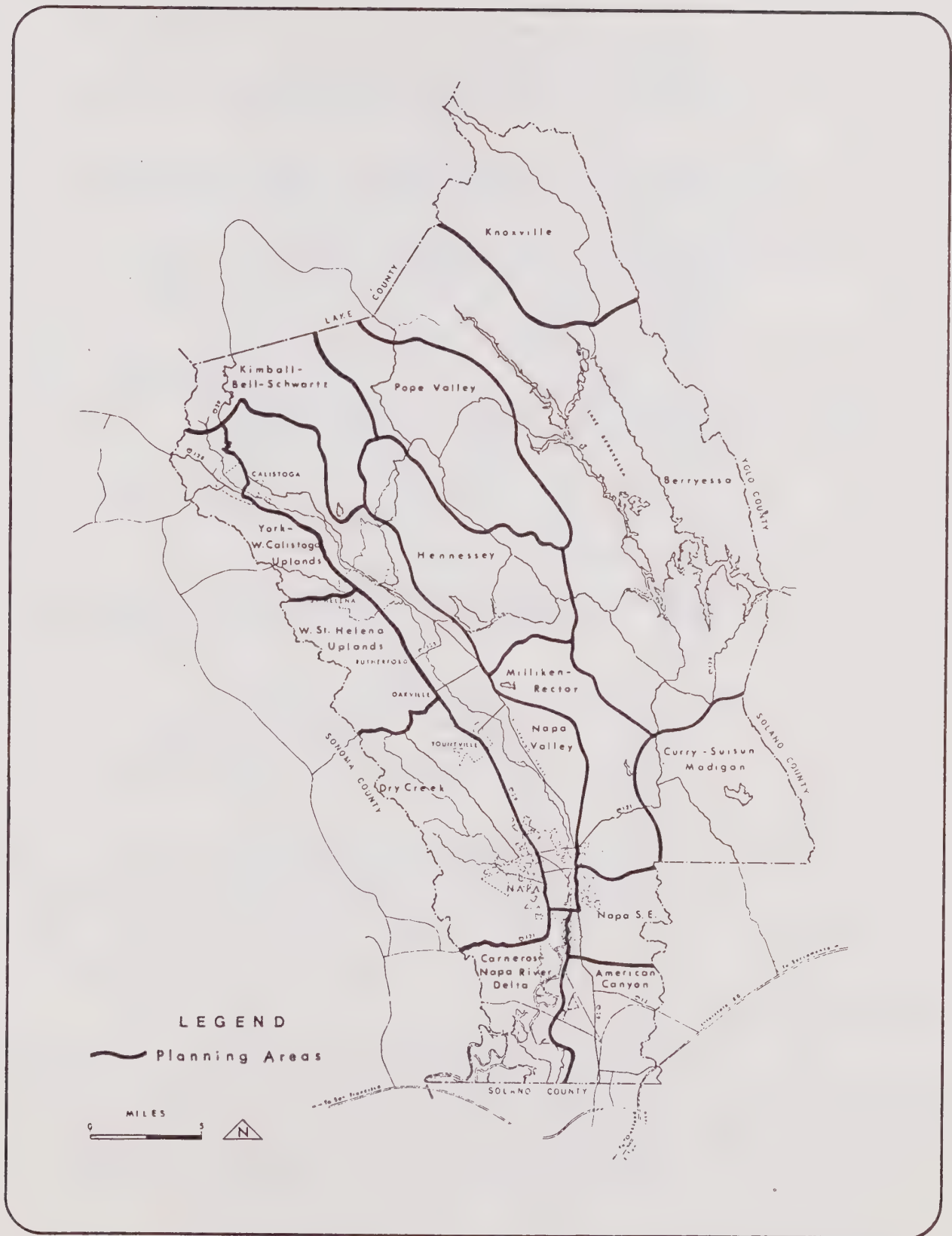
6. Conservation Policy

(a) All Fishery and Wildlife Habitat

1) Residential, commercial, industrial, agricultural and water development projects should include management plans for fishery, wildlife and recreation purposes, including provision to:

- a) Employ supplemental planting and maintenance of grasses, shrubs and trees of similar quality and quantity to provide adequate vegetation cover to keep the watersheds, especially stream side, in good condition and to provide shelter and food for wildlife.
 - b) Provide protection for wildlife habitat.
 - c) Provide replacement habitat of like quantity and quality.
 - d) Provide, on public water development projects, adequate public access to the water and an adequate release flow of water to maintain pool to preserve fish population.
- 2) Provide the following essentials for fish and wildlife resources:
- a) Sufficient oxygen in the water.

FIGURE 78: PLANNING AREAS



- b) Adequate amounts of proper food.
 - c) Adequate amounts of feeding, escape and nesting habitat.
 - d) Proper temperature, chemical content, salt content and velocity of water.
- 3) Adopt and enforce riparian woodland protection ordinance and other appropriate ordinances.
- 4) The County will protect the public interest in drainage systems and water impoundments from sedimentation, siltation, and contamination and ensure that urban, agricultural and resource development projects utilize sound short-term and long-term erosion control measures. The County, working in conjunction with the Soil Conservation Service, will monitor hillside agricultural operations, and in conjunction with the Soil Conservation Service, establish standards for terracing, contour planting, and maintenance of permanent crops on slopes exceeding 15%.
- 5) Encourage programs to protect wildlife species that are becoming increasingly rare. Some examples, but not an all-inclusive list, are:
- a) Rails are salt and freshwater marsh birds. Bay fill programs and weed and vegetation control inland has tended to reduce habitat for the California Clapper Rail and Black Rail.
 - b) Plovers are shore birds which are still quite common, but are confronted with a steadily reduced amount of habitat due to destruction of suitable shallow marsh and tideland areas.
 - c) Salt Marsh Harvest Mouse is endangered because of destruction of salt marshes.
 - d) Herons, Egrets and Red-Shouldered Hawks are becoming scarce due to destruction of riparian growth along streams and sloughs.
 - e) White Tail Kites are becoming scarcer because of conversion of valley meadows and grasslands.

(b) Riparian Woodland Wildlife Habitat

- 1) Natural vegetation retention areas along perennial and intermittent streams shall vary in width with steepness of the terrain, the nature of the undercover, and type of soil.
- 2) To offset possible additional losses of scarce riparian woodlands, due to conversions, developer shall provide and maintain similar quality and quantity of replacement habitat or in-kind funds to an approved wildlife habitat improvement and acquisition fund.
- 3) Enforce riparian woodland protection ordinance.

(c) Reservoir Habitat: Encourage waterfowl in shallow, open shoreline areas of reservoirs by planting, when possible, appropriate vegetation for waterfowl food.

(d) Marshland Habitat (See also air quality)

- 1) Return salt extraction ponds to marshlands or other non-urban uses for recreation, fisheries and wildlife habitat at the termination of salt extraction activity.
- 2) Utilize reclaimed waste water of salinity control and management of marshlands, meadows and salt ponds.
- 3) Establish County Policy for promoting, when possible, wildlife habitat use of marshland areas such as Coon Island, Fly Bay, Devil's Slough, the area between Napa Slough and South Slough, Fagan Slough Peninsula, Bull Island, all of the berm areas between the top of the levee and center of the slough and nearby marshland and meadowlands.
- 4) Encourage environmental study area, viewing platform, wildlife preserve on Bull Island and Fagan Slough Area.
- 5) Discourage the location or construction of structures on levees by large lot zoning because of environmental health problems, potential flood hazard and wildlife habitat.
- 6) Rezone marsh areas and tidal waterways to minimum of 40 acres per dwelling unit.

(e) Oak Woodland - Grass and Hardwoods

- 1) Support hardwood cutting criteria that require adequate stands of oak trees for wildlife and slope stabilization, soil protection and soil production be left standing.
- 2) Preserve, when possible, small one-half to five acre oak tree pockets that occur near the heads of drainages or depressions on north facing slopes to maintain diversity of vegetation type and wildlife habitat.
- 3) Maintain to the fullest extent possible a mixture of oak species which is needed to insure acorn production. Black, canyon, live and brewer Oaks as well as blue, white, scrub, and live oaks are common associations.
- 4) Preserve the larger groves of native Valley and Live Oaks on all Valley floors.

(f) Coastal Forest and Conifer Habitat

- 1) Follow Conservation Policies and Standards relative to riparian woodland habitat and oak woodland - grass and hardwood habitat.

(g) Fisheries Habitat

1) Napa River and its Tributaries

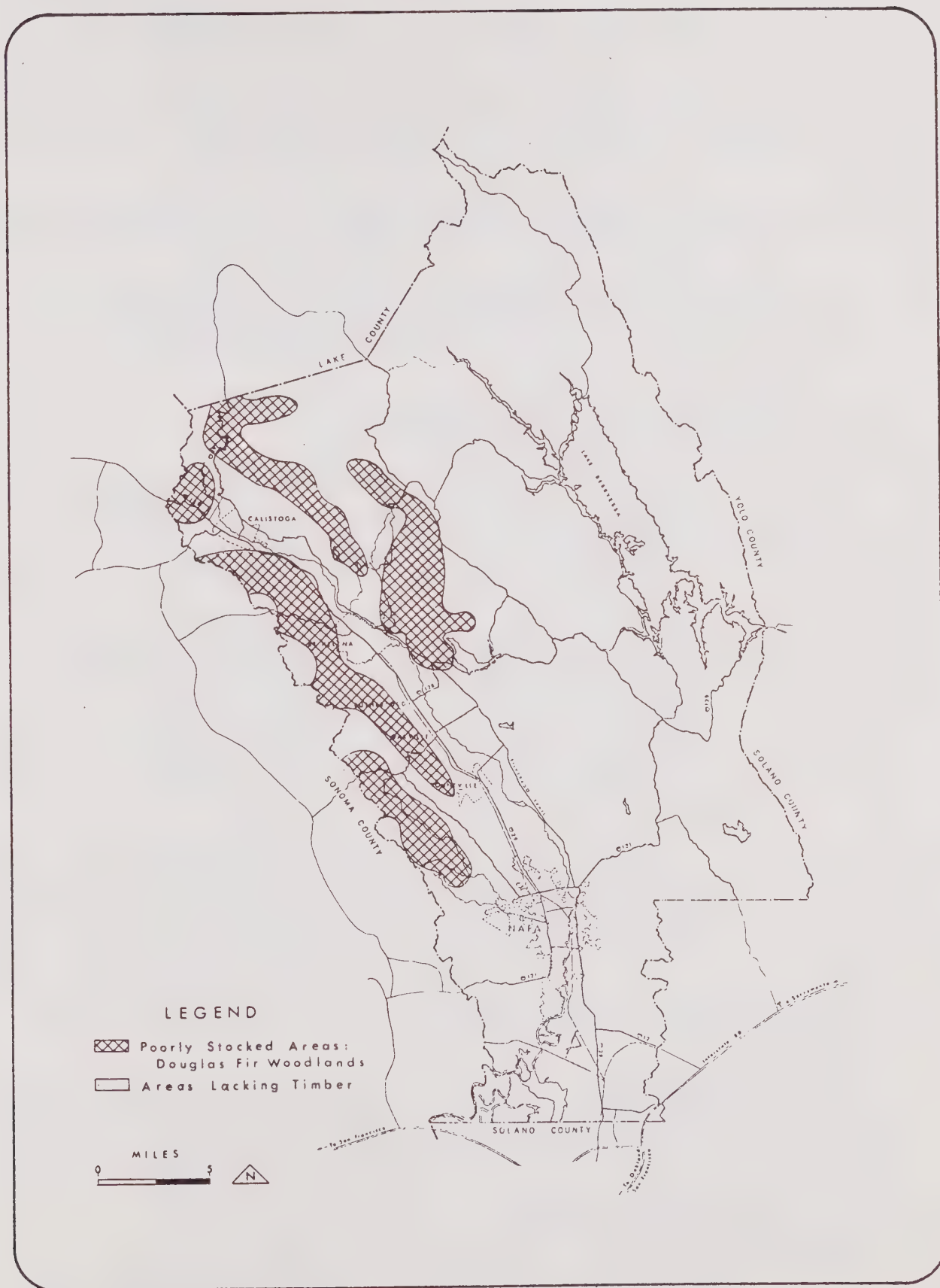
- a) Implement sediment reduction measures in sand and gravel operations and other high sediment producing land uses because soil nitrates stimulate oxygen consuming algae in the river.
- b) Encourage feasibility study of reclamation of waste water as means of keeping adequate water flow to support fish life and reduce pollution of the river.
- c) Prevent the removal of stream side vegetation to reduce the potential to increase water temperature and siltation and improve fishery habitat.
- d) Promote good forest management.

2) Tributaries of Lake Berryessa

- a) Enforce boat speed limits in arms of Lake

6/7/83

FIGURE 79: CONIFEROUS TIMBER



and small coves to reduce damage to warm water game fish fisheries.

- b) Control gravel removal from stream beds to minimize the adverse effects upon the spawning and feeding areas of fish.
- c) Control silt production from mines, road farm pond, construction sites and other potential sources.
- d) Prevent the removal of stream side vegetation to reduce the potential to increase water temperature and siltation and improve fishery habitat.

(h) Slough and Tidal Mudflats

- 1) Filling, dredging, draining and polluting of mudflats and sloughs should be restricted to provide an adequate supply of oxygen, retain habitat and maintain food organism production to conserve fish and wildlife and reduce pollution.
- 2) Utilize reclaimed waste water for salinity control of mudflats and sloughs where needed.
- 3) Evaluate proposed marinas and harbors with regard to alternative sites with first priority for wildlife habitat and impact on scarce landforms such as marshlands.
- 4) Dredging for marina construction and maintenance requires a heavy public subsidy while serving a small portion of the total citizenry. Consideration should be given to having their construction and maintenance dredging done by private enterprise rather than public agencies.

B. Areas Required for Ecological and Other Scientific Study Purposes

- 1. Planning Goal: Encourage preservation and scientific study of prime examples of plentiful features and rare or unique features, fragile ecological sites, and minimize disturbance of ecological processes.
- 2. Conservation Policy
 - (a) Prepare priority list identifying critical areas and features threatened by destruction and

6/7/83

encourage their inclusion in a natural resources conservation or open space easement area which should include the following features:

- 1) The destruction of vegetation should be prohibited for commercial purposes or other purposes except by County permit with a subsequent replacement program;
 - 2) Filling, excavation or material alteration of the landscape should be prohibited;
 - 3) The obstruction of stream flow by man-made facilities should be regulated by County permit or prohibited;
 - 4) Installation of urban structures and related facilities such as residential, commercial and industrial buildings and advertising of any nature, should be prohibited.
 - 5) Mining, excavation, drilling or otherwise exploring for mineral, geothermal, sand, gravel or hydro-carbon resources should be prohibited.
- (b) Prepare specific plans (within the meaning of Sections 65451-2 of the Government Code), establish plan lines or open space easements with limited access rights to enable scientific study of representative samples for plentiful features and the majority of rare and unique examples of botanical and geological features, fish and wildlife habitats, historic and archaeological sites and the least disturbed watersheds.
- (c) Provide protective measures for these sites and critical areas. The location and significance of these features is not fully understood. As they are discovered, they should be identified on an environmental constraints map so that appropriate steps can be taken to protect them, where necessary, to prevent destruction by water pollution, visual distractions, excessive numbers of persons, etc.
- (d) Protect existing or potential areas for ecological and other scientific purposes such as Los Posados State Forest, Cleary Wildlife Preserve, Napa Marsh area, Cedar Roughs, and Cedar Valley, Milliken Reservoir, Kimball Canyon watershed, Napa College property near Dry Creek Road and properties owned by the Nature Conservancy and appropriate Federal, State and local government property.

II. OPEN SPACE FOR MANAGED PRODUCTION OF RESOURCES

A. Natural Resource Lands for Forestry and Woodcutting

1. Planning Goal: Protect and conserve Napa County's remaining forests and woodlands; allowing reasonable use of private land.

LOCATION - Uplands surrounding the northerly one-half of the Napa Valley where soil type and thickness, and climate are suitable for coniferous habitat, generally in the West St. Helena Uplands, York-West Calistoga Uplands, Hennessey, and Kimball - Bell - Schwartz Planning Areas.

Commercial woodcutting occurs in widely distributed areas throughout the County.

2. Conservation Policy

- (a) Coastal Forest and Minor Conifer Habitat: Follow Conservation Policy for oak woodland - grass and hardwood habitat and riparian woodland habitat. Encourage active forest management practices including timber harvesting to preserve existing forests.

- (b) Oak Woodland - Grass and Hardwood

- 1) Support hardwood cutting criteria to insure the retention of adequate stands of oak trees for wildlife and follow cutting patterns recommended by the State Department of Fish and Game and other studies.
 - 2) Maintain a mixture of oak species when needed to insure acorn production. Black, canyon, live and Brewer Oak as well as blue, white, scrub, and live oaks are common associations.
 - 3) In timber clearing areas, when possible, leave stand natural groups of oaks, one-half to five acres for food, denning, nesting and shelter. Preserve variety of these groups to maintain annual acorn production.
 - 4) Retain appropriate numbers of hardwood trees to insure regeneration. Encourage timber plantations for fuelwood production.

(c) Riparian Woodland Habitat

- 1) Natural vegetation retention areas along perennial and intermittent streams shall vary in width with steepness of the terrain, the nature of the undercover, and type of soil.
- 2) To offset possible additional losses of scarce riparian woodland, due to conversions, developer shall provide and maintain similar quality and quantity of replacement habitat or in-kind funds to an approved wildlife habitat improvement and acquisition fund.
- 3) Enforce County regulations which protect riparian woodlands.

B. Rangeland

1. Definition: Land actively used or potentially useful for commercial animal grazing or browsing.
2. Planning Goal: Identify, improve and conserve Napa County's rangeland.

LOCATION - Rangelands are located throughout Napa County with large areas in the southern half of the County. Available and potential rangelands include flat areas and slopes, covered by grass and brush, which is generally unsuitable for irrigated agriculture.

3. Conservation Policy

- (a) Provide a permanent means of preservation of open space land for rangeland use by utilizing, whenever possible, methods such as exclusive permanent agriculture zoning or acquisition to purchase, gift, grant, bequest, devise, lease or otherwise, the fee or any lesser interest or right in real property and lease-back to agriculturalists.
- (b) Encourage responsible brush removal techniques with adequate environmental safeguards.
- (c) Leave uncleared islands and peninsulas to provide cover for wildlife.
- (d) Land conversion operations should be staged to minimize adverse environmental impact on the watershed.

- (e) Encourage animal management activities to avoid destruction of rangeland productivity and watershed capacity through overgrazing.
- (f) Encourage replanting of depleted areas to restore rangeland productivity.
- (g) Establish economically feasible minimum lot sizes for the purpose of preserving rangeland open space uses in appropriate locations.
- (h) Promote coordination of vegetation conversion programs with watershed enhancement programs to insure continued recharge of Napa County water supplies.
- (i) Promote Coordination of rangeland management programs of the County with those of other Counties, the State of California, and the Federal government in areas where vegetation conversion programs are planned.

C. Agricultural Land

- 1. Definition: Land actively used or with potential use for the purpose of producing an agricultural commodity for commercial purposes.
- 2. Planning Goal: Maintain and enhance the agricultural environment of Napa County.

LOCATION - Agricultural open space lands are located in Carneros and Coombsville and Capell, Chiles, Congress, Foss, Gordon, Napa, Pope and Wooden Valleys, and hillside viticultural areas.

3. Conservation Policy

- (a) Limit growth to minimize urban development on prime soils and reduce conflict with the agricultural operations and economy.
- (b) Encourage reclaimed water use for vegetation enhancement, frost protection and irrigation to enhance agriculture and grazing.
- (c) Provide a permanent means of preservation of open space land for agricultural production by utilizing, wherever possible, methods such as the Williamson Act, exclusive permanent agriculture zoning or acquisition by purchase, gift, grant,

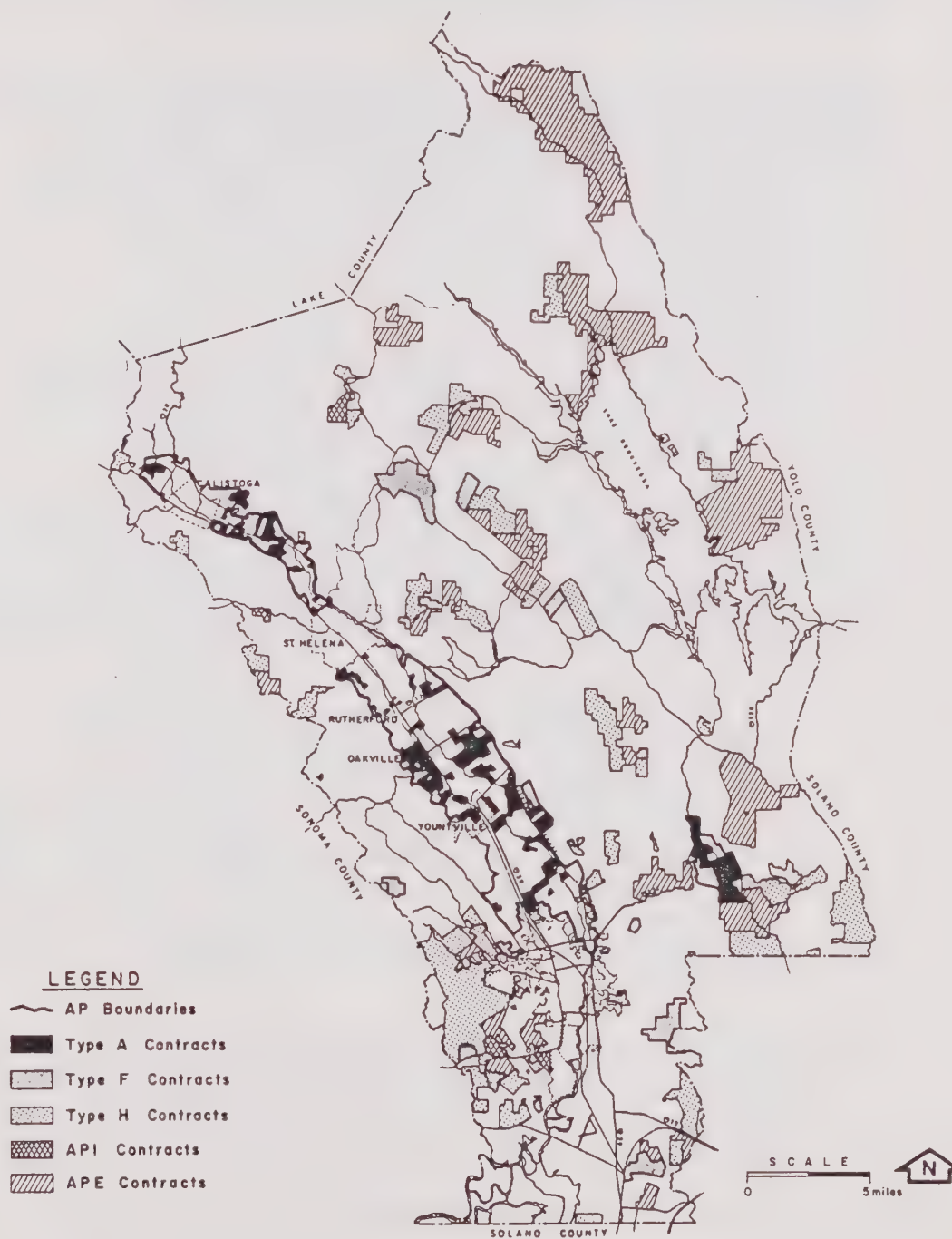
bequest, devise, lease or otherwise, the fee or any lesser interest or right in real property and lease-back to agriculturalists.

- (d) Protect trees and shrubs for wildlife habitat and aesthetic purposes and encourage alternate uses, such as wildlife and recreation if feasible without undue environmental damage when grazing is phased out.
- (e) Encourage inter-agency and inter-disciplinary liaison to continually monitor and evaluate pesticide and herbicide programs on all phases of the environment and extend programs in air and wildlife and to recommend changes as needed to prevent any environmental degradation.
- (f) Minimize pesticide and herbicide use and encourage research and use on integrated pest control methods such as cultural practices, biological control, host resistance and other factors.
- (g) Encourage Williamson Act contracts for agricultural lands adjoining cities by adopting and implementing policies such as large lot zoning, urban limit lines, etc., to limit urban expansion and encourage development of vacant land in areas already urbanized.
- (h) Encourage the establishment of a green belt of land used for agriculture, wildlife habitat, recreational or other suitable open space purposes in the American Canyon Area along North Slough, Fagan Creek, American Canyon Creek, and the Eucalyptus Tree Grove to the west of Oat Hill.
- (i) Establish minimum lot sizes of not less than 40 acres for the purpose of preserving agricultural open space uses in appropriate locations.

D. Watershed or Ground Water Recharge Land

- 1. Definition: Land designated on the State or any regional or local Open Space Plan as open space land which is important in order to maintain the quantity and quality of water necessary to the people of the State or any part thereof.
- 2. Planning Goal: To improve the management and protection of the County's water resources.

FIGURE 81: AGRICULTURAL PRESERVES



Source: Napa County Conservation,
Development and Planning Department

LOCATION - Drainage basins for domestic water supply reservoirs such as Lake Berryessa, Lake Hennessey, Friesen Lakes, Rector, Kimball Canyon, Bell Canyon, Milliken and Curry Reservoirs and watershed areas and lands for ground water recharge at the borrow pit west of Rector Reservoir and at Conn Creek near Silverado Trail.

3. Water and Its Hydraulic Force: The State requires a section on water and its hydraulic force in the Conservation Element, however, the Flood Control and Water Conservation District reports that the fall distance of water is generally not adequate for utilizing hydraulic force.
4. Conservation Policy
 - (a) Protect potential ground water recharge areas from urban encroachment because of the potential need to replenish underground water table to prevent land subsidence or for other reasons.
 - (b) Evaluate land use policies and encourage the density and type of land use that will provide a stable vegetation cover to improve water quality, reduce contamination, pollution and siltation within boundaries of watersheds for existing and potential reservoirs.
 - (c) Plan water supply and waste water treatment facilities to serve high density service areas. Establish boundaries and facilities for economies of construction, maintenance, and operation based on population size and distribution taking environmental considerations into account. Use the most technically advanced waste water treatment and reuse facilities available with reuse of treated waste water and prevention of salt water intrusion.
 - (d) Encourage the maximum protection of all environmental values at solid waste disposal sites by the adoption of standards of planning design construction, operation and maintenance of the disposal site which would include:
 - 1) Location away from residential areas;
 - 2) Screening from view;
 - 3) Good road access, not through residential areas;

- 4) No inhabited areas downwind from the site because dust and odor problems can occur in even the most carefully conducted operations;
 - 5) Location to prevent flooding and pollution and contamination of surface and ground water;
 - 6) Maximum haul distance standards.
- (e) Encourage establishment of a student oriented research center. Some research is already being done by students from Pacific Union College in Angwin, the University of California at Davis, Napa College and some of the high schools, but additional data is needed to determine base-line standards and long-term recording procedures for reservoir, ground and surface water quality monitoring, rain fall, and temperature records.
- (f) Re-examine land use policies in light of the steadily expanding body of knowledge and findings forthcoming from several current and proposed Federal, State, regional and local monitoring, feasibility and planning programs. The Legislature's enactment of the Porter-Cologne Act has vested within the State Water Resources Control Board specific authority to promulgate specific policies regarding many aspects of water quality in categories such as:
- 1) Water reclamation and reuse;
 - 2) Discharge to bays and estuaries;
 - 3) Discharge to surface fresh-water and ground water;
 - 4) Waste water management in rural and urban areas;
 - 5) Disposal of solid wastes;
 - 6) Thermal waste waters;
 - 7) Siltation;
 - 8) Storm water discharges;
 - 9) Vessel wastes;
 - 10) Recreational vehicle wastes.

E. Mineral Deposits

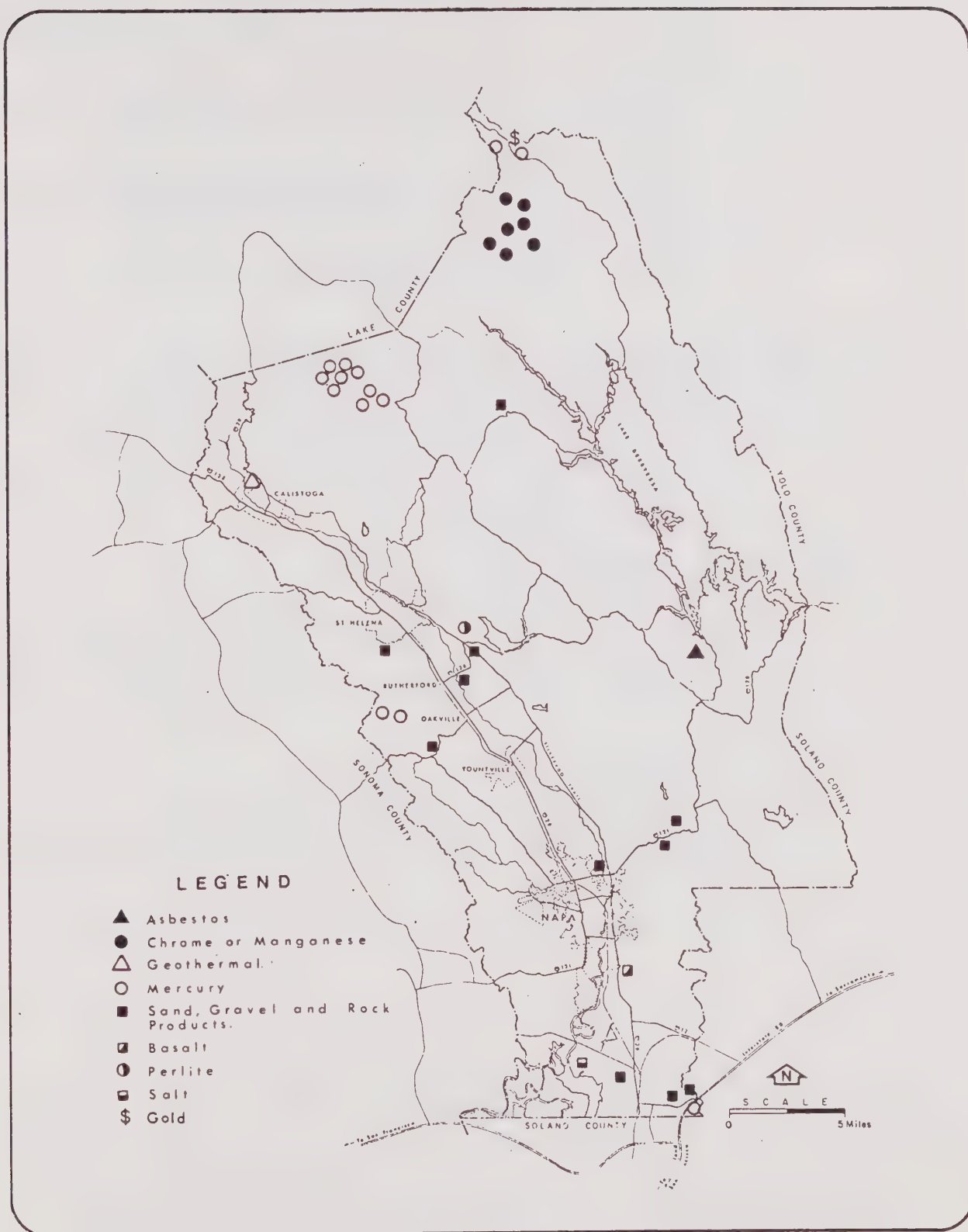
1. Definition: Land possessing or encompassing natural resources, the use or recovery of which can best be realized by the use of land in conformance with the following Conservation Policies:
2. Planning Goal: To identify the mineral needs and mineral resources of the County and provide for the wise use and management of these resources in a manner compatible with environmental considerations.

LOCATION - Widely distributed in Napa County.

3. Conservation Policy

- (a) Identify the location and extent of the County's mineral resources.
- (b) Evaluate resource extraction standards with regard to economic, environmental, site rehabilitation and other considerations. Develop resource extraction standards, emphasizing environmental implications, such as air pollution, visual distractions, siltation of nearby streams, increase in surface run-off, removal of underground water by pumping, increase in erosion or landslide hazard, disposal of chemical wastes, creation of impervious layers and surface compaction, extent of vegetation removal and site rehabilitation procedure.
- (c) Encourage compatible use of resource areas such as low density recreation, wildlife habitat, or agriculture and protect resource areas from incompatible uses.
- (d) Establish an information center for both published and unpublished data.
- (e) Serve as a clearing house for technically trained persons in the U.S. Geological Survey and other Federal agencies, the State Division of Mines, universities and industry, to integrate their mineral development and conservation program into the fabric of the County's General Plan.
- (f) Maintain an inventory of potentially productive mineral deposits in Napa County.

FIGURE 82: MINERAL DEPOSIT LANDS



- (g) Ensure the long-term production of Aggregate Resource Areas identified by the State pursuant to Public Resources Code Section 2762 or:

Added
12-22-87

- (1) Recognizing mineral information classified by the State Geologists
- (2) Assisting in the management of land use which affects areas or Statewide and regional significance; and
- (3) Emphasizing the conservation and development of identified mineral deposits (see Figure 14).

- (h) Continue to enforce established policy on geothermal energy exploration and development (Napa County Code Section 10400 et seq.) (Mostly in the Calistoga Area) considering the potential adverse environmental effects such as noise pollution, air pollution, water pollution, and poorly located transmission lines that can accompany improper geothermal development.

Revised
12-22-87

F. Lands for Sand and Gravel Resources

1. Planning Goal: To identify the needs and resources of the County and Provide for the wise use and management of the resources in a manner compatible with the environmental conditions.
2. Conservation Policy
 - (a) Prevent removal of stream bed sand and gravel in any manner that would cause adverse effects on water quality, fishery and stream side vegetation resources.
 - (b) Same Conservation Policy as mineral deposits.

III. OPEN SPACE FOR OUTDOOR RECREATION

A. Recreational Land

1. Definition: Any area of land or water designated on the State, or any regional or local Open Space Plan as open space land and which is actively used or potentially usable for recreational purposes.
2. Planning Goal: To provide a full range of recreational areas and facilities for the residents of the County.
3. Conservation Policy
 - (a) Implement the recommendations of the adopted Napa County Park and Recreation Plan, which identifies the recreation and open space needs and potentials of the County including the relationships of County needs and potential to area-wide, regional and State facilities.
 - (b) Augment site selection for roadside rest areas.
 - (c) Encourage wildlife habitat improvement for hunting or non-consumptive wildlife uses such as photography and maintaining food chains and checks and balances of natural habitats.
 - (d) Provide recreational and open space opportunities around percolation ponds, ground water recharge basins, flood control channels and similar works by maximizing scenic and wildlife habitats by retaining natural vegetation, installing supplementary landscaping, acquiring additional land for open space purposes and by shaping the structures to have a more attractive form and greater usefulness for open space activities.
 - (e) Promote development of local State Parks for recreation.
 - (f) Promote non-motorized riding and hiking trails.
 - (g) Provide appropriately located areas for off-road vehicle use. Encourage public agencies to regulate off-road use on publicly owned lands.

B. Areas of Outstanding Historical and Archeological Value

1. Planning Goal: Encourage preservation and scientific study of areas of unique historical and archeological value.

2. Conservation Policy

- (a) Prepare priority list identifying critical areas and features threatened by destruction.
- (b) Prepare specific plans (within the meaning of Sections 65451-2 of the Government Code), and establish plan lines or other appropriate devices to protect sites and a protective buffer zone for the sites.
- (c) Implement Conservation Policies (a), (b), and (d) from 1B "Areas Required for Ecological and other Scientific Study Purposes" as applicable to areas of outstanding historical and archeological value.

C. Areas of Outstanding Scenic Value

- 1. Planning Goal: Encourage preservation of and visual access to the natural beauty of the County.

2. Conservation Policy

- (a) Identify and preserve the area's architectural and historical landmarks.
- (b) Develop programs for undergrounding utility lines.
- (c) Develop a program for highway beautification (see Scenic Highways Element).
- (d) Develop comprehensive sign standards and regulations to fit the unique character and need of the area.
- (e) Land use patterns should include visual consideration to prevent the destruction of visual quality. The landscape can easily become a hodge-podge of roof tops, shining mobilehomes, power lines and poles. Therefore, the appropriate density and cluster subdivision design form should be carefully planned.
- (f) Implement Conservation Policies (a), (b), (c), and (d) from 1B "Areas Required for Ecological and Other Scientific Study Purposes" as applicable to areas of outstanding scenic value as high priority.

6/7/83

IV. OPEN SPACE FOR PUBLIC HEALTH AND SAFETY

A. Areas Which Require Special Management or Regulation Because of Hazardous or Special Conditions

1. Definition: Land which by nature of the dynamic processes of land, air and water present a potential hazard to public health and safety.
2. Planning Goal: Provide for public health and safety where soil, geology, land slope, fire hazard, marshes, flood plains, or other hazards make building for human occupancy hazardous.
3. Open Space Land for Public Health and Safety Includes:
 - (a) Earthquake Fault Zones - Suspected faults in Napa County (see Figure 85) roughly parallel the northwest-southeast course of the San Andreas Fault, which, at its closest point is about 30 miles southwest of the City of Napa. three main active faults have been identified within Napa County. From east to west they are the Cordelia, Green Valley, and West Napa faults. The Hunting Creek Fault, a fourth active fault shown on Figure 85, is a possible northward extension of the Green Valley Fault. Based on fault length it is estimated that the three main faults involved are capable of producing earthquakes with a Richter magnitude of up to 6 3/4. Such an earthquake, which is considered a moderate-sized event, is capable of producing a substantial amount of damage, even to wood-frame structures.

A map of epicenters of earthquakes between 1944 and 1965 has been prepared based on information received from the University of California Seismographic Station. The epicenters appear to cluster near the areas of contact between the edges of the Central Valley sequence of sedimentary rock units and other major rock units. The location of the epicenters and fault lines must be considered approximate because they were transferred from basic geological maps and epicenter lists of a general nature. Twenty epicenters are clustered near the east County boundary along Blue Ridge north of Putah Creek and the north slope of Vaca Mountain. Another pattern of 23 epicenters extends from Cedar Roughs Ridge in line through Capell, Gordon and Suisun Valleys. A group of 23 epicenters was scattered along the ridges west of the Napa Valley between Mount Veeder and Diamond Mountain. (See Figure 90)

- (b) Unstable Soil Areas - The Dibble-Los Osos Soil Association which underlies 23% of Napa County is the most critical for soil slumps because of weak subsoil as evidenced in Circle Oaks Subdivision. This soil condition can be magnified by steep gradients, excessive ground water, and unstable base rock. Although these factors may be surmountable, they often require costly and continuous maintenance practices.

4. Conservation Policy

- (a) Limit lands having existing or potentially severe erosional characteristics, excepting Oat Hill, to low density or no development. Erosion can contribute to landslides, floods, water pollution and landscape scars. Less land area is disturbed and subjected to the forces of erosion by limited development activity.
- (b) Reduce erosion by the retention of trees, brush and grass. The planting of vegetative cover on bare, highly erosive areas should be undertaken as a conservation measure wherever possible.
- (c) Excepting Oat Hill, prohibit development on lands having severe construction limitations. Although remoteness, adverse soil conditions for foundations and shrink-swell behavior, slope over 15%, circulation, and utility problems are not insurmountable obstacles to development, they often require costly and continuous maintenance practices after development which may have to be paid by the general public. Alternative uses such as controlled recreation, wildlife management or agriculture should be encouraged on land having extensive or unusual construction limitations. If range grazing dwindles, recreational and conservation uses of areas with natural streams, ponds, or woodlands should be encouraged. Installation of small dams in suitable areas can be a recreational asset as well as a conservation asset by serving as sediment and flood water retardation facilities.
- (d) Require geological engineering investigations and building code revisions within potential hazardous areas and areas subjected to amplified earthquake motion or subsoil liquefaction such as valley alluvial soils or marshlands.

- (e) Adopt and enforce a grading ordinance and top soil removal ordinance.
- (f) Protect the public interest in drainage systems and water impoundments from sedimentation, siltation, and contamination and ensure that urban, agricultural and resource development projects utilize sound short-term and long-term erosion control measures.

B. Flood Plains

1. Location: Flood plains of prime significance for open space planning are found in the American Canyon, Napa River Delta - Carneros, and Napa Valley Planning Areas. Other flood plains are located in the Dry Creek, Berryessa, Pope Valley and Curry - Suisun - Madigan Planning Areas. Further studies are needed to determine flood parameters and potential frequency more precisely.
2. Planning Goals
 - (a) Restrict and regulate urban development in areas of flood risk.
 - (b) Protect the vegetation and animal habitats of the waterways and flood plains from encroachment of urban development.
 - (c) Protect existing areas of urban development from flooding.
3. Conservation Policy
 - (a) Restrict and regulate structures in the floodway and flood plain of all unincorporated areas subject to flooding, in the 100 year flood, as identified in HUD Floodway and Flood Plain Insurance Rate Maps.
 - (b) Adopt flood plain zoning in all applicable areas, and investigate the compatibility of zoning areas adjacent to flood plains for recreational uses. Flood plains along streams which feed Lake Berryessa, The Napa River, and the Suisun Marsh are zoned for agricultural uses in the majority.
 - (c) Continue to encourage provision for flood insurance. The Napa County Flood Control and Water Conservation District and the Napa County Board of Supervisors have obtained Federal Government

approval of Napa County for flood insurance and have agreed, in return, to enact local land use and control measures for areas having special flooding problems. The controls are to be consistent with Federal criteria.

- (d) Encourage development and implementation of flood plain management safety and flood control programs that protect homes and property, as well as stream side vegetation, and control obstruction of natural floodways.

Permanent installations may be excluded from flood plain land. Seasonal flooding of streams, deposits of rock and sediment and bank undercutting make some areas difficult to develop. Occasional high water level in the Lakes floods low lying area for short durations.

- (e) Maintain water courses and vegetation within urban areas as components of an open space system. Develop pedestrian and riding trails if compatible with riparian (stream side) vegetation and wildlife habitat. Develop public access at frequent intervals.
- (f) Maintain water courses and vegetation within rural areas as components of an open space system and develop public access or roadside rests at crossroads where compatible with surrounding land uses.

C. Areas Presenting High Fire Risk

1. Location: Most of the hilly areas of Napa County present a high fire hazard. Napa County along with the entire State of California, has a wildland fire potential that is found nowhere else on earth. The combination of highly flammable vegetation (fuel), long and dry summers (weather), rugged topography (steep slopes) and people who live, work and recreate in the wildlands adds up to a situation that results in wildfire risk and hazards of major proportions. Protection of the nearly 400,000 acres of range land, forest and watershed lands in Napa County is important for timber, recreation, wildlife, watershed, flood control and erosion prevention reasons. (See Figure 102)
2. Planning Goal: Discourage low density residential development in woodland - grass and brush areas that are heavily fueled.

3. Conservation Policies:

- (a) Encourage environmentally sound programs for protection against fire hazard. Include in program for protection against fire hazard and fire protection planning consideration of fire protection elements, including topography, land use, traffic flow, safe ingress and egress, water system, fuel breaks, clearance of vegetation around structures and roadsides, use of fire resistant building materials, clearly designated street names and numbers, and emergency heliports.
- (b) Rezone open space lands subject to high fire risk to the :FR (Fire Risk) Combination District.

D. Protection of Water Quality and Water Reservoirs

- 1. Location: Water reservoirs for human consumption are fed by stream systems in the Curry-Madigan-Suisun, Milliken-Rector, Hennessey, Berryessa, Knoxville, Pope Valley, Kimball-Bell-Schwartz, and York-West Calistoga Planning Areas.
- 2. Planning Goal: Protect the County's watersheds and public water reservoirs to accomplish the following purposes: For clean drinking water, for public health and safety, for support of the eco-system, for recreation, for scenic beauty, and for open space.

3. Conservation Policies

- (a) Protect streams from encroachment by establishment of "Official Plan Lines," riparian woodland ordinances and protection procedures, stream obstruction zoning, flood plain zoning and other appropriate methods.
- (b) Encourage flood control agencies to give full consideration to scenic, fish, wildlife, and other environmental benefits when computing costs of alternative methods of flood control.
- (c) Establish minimum lot sizes of not less than 40 acres to encourage rural densities in rural, non-agricultural areas and to reflect desirable densities based on access, slope, productive capabilities for agriculture and forestry, sewage disposal, and water supply, wildlife habitat and other environmental impact considerations.
- (d) Adopt and enforce Grading and Soil Removal Ordinances to prohibit grading and excavation unless it can be demonstrated that such activities will not result in soil erosion, silting of lower slopes, slide damage, flooding problems, severe

cutting or scarring, or damage to wildlife and fishery habitats.

- (e) Manage reservoir outflows to provide minimum pool for maintaining fish life and riparian (stream side) vegetation.
- (f) Encourage cautious use of chemical treatment of reservoirs to prevent undue damage to fish and wildlife resources.

E. Protection and Enhancement of Air Quality

1. Location: Planning areas of prime significance for air quality are the marshlands in the Napa River Delta, the upper Napa Valley, Pope Valley, and Berryessa Planning Areas where warm air temperature inversion layers are more frequent.
2. Planning Goal: Abate existing air quality problems and prevent or regulate potential air quality problems.
3. Conservation Policies
 - (a) Discourage scattered development which contributes to continued dependence on the private automobile as the only means of convenient transportation.
 - (b) Prevent filling of existing river areas, berm areas, salt ponds, wetlands and marsh areas because these areas are important for public health and safety as their water surfaces lowers the air temperatures, they serve as irreplaceable fish and wildlife habitat, they are subject to amplified earthquake movement and subsoil liquification, and they support oxygen producing plants. If all the marshlands and evaporation ponds in Napa County were filled and urbanized:
 - 1) The average maximum temperature could rise about 2 degrees F. during the warmest months;
 - 2) The number of days over 90 degrees temperature can be expected to increase, which would increase the frequency of the temperature inversion layer which acts as a lid controlling the amount of air available to dilute the pollutants;
 - 3) With more days over 90 degrees, work efficiency in non-air-conditioned jobs would be lessened,

6/7/83

educational activities in schools would be less efficient, and low income families being less likely to have air-conditioned homes would suffer the most. A 2 degree F. rise in average maximum temperature could increase the cost of air-conditioning equipment between \$10,000 to \$30,000 for a new 100,000 square foot building and contribute to the potential energy shortage by utilizing non-renewable fossil fuels.

F. Open Space to Guide Urban Growth

1. Definition

- (a) Lands to preserve community identity are flat lands (0-15%) and lands along existing transportation routes adjacent to proposed urban development (within 30 minutes of city centers).
- (b) Lands to prevent inefficient urbanization not designated for urban uses on the Land Use Plan Map (Figure 14) are isolated steeply sloping lands (30%+) and lands without existing water and sewage facilities.
- (c) Open spaces not designated for urban uses on the Land Use Plan Map (Figure 14) that provide neighborhood, district and city identity.
- (d) Open spaces not designated for urban uses on the Land Use Plan Map (Figure 14) that provide separations between conflicting land uses.

- 2. Planning Goal: Preserve and create an open space system that will maintain community identity.

3. Conservation Policies

- (a) Maintain community identity by preserving the open spaces not designated for urban uses on the Land Use Plan Map (Figure 14) which distinguish and separate various communities.
- (b) Use open space not designated for urban uses on the Land Use Plan Map (Figure 14) to preserve and enhance the unique characteristics of each community in Napa County.
- (c) Design residential development to reflect natural processes as well as engineering and economic considerations.
- (d) Preserve open space not designated for urban uses on the Land Use Plan Map (figure 14) needed to separate conflicting land uses.
- (e) Foster a sense of outdoor spaciousness for the widest possible range of people, with particular

attention to the needs of low-income groups, and persons with limited mobility.

- (f) Include the creation and preservation of appropriate open space as an integral part of the planning and development process.
- (g) Encourage development that is designed so as to include linkages between the major open space areas.
- (h) Encourage the use of agriculture, particularly tree and open field crops, to provide visually pleasing open space and variety within an urban environment.
- (i) Preserve open space as necessary to direct urban growth to conform with the goals, objectives, policies, and standards of Napa County's General and Special Plan Elements.
- (j) Encourage use of vacant land for open space purposes such as agriculture or wildlife habitat adjoining cities by adopting and implementing policies such as large lot zoning, urban limit lines, etc. to prevent urban expansion and encourage development in vacant lands already urbanized.

3. OPEN SPACE ACTION PROGRAM

In preparation of the Conservation and Open Space Element of the General Plan, the need for more detailed studies in the area of conservation was readily apparent. It is anticipated that these studies will be conducted within the policy framework established as part of this Plan. Individual studies will explore, in detail, open space, natural resources, managed resource production, outdoor recreation, and health and safety. Policies contained on pages 216-244 constitute the ongoing action program required by Government Code Section 65564.

The Conservation and Open Space Element is being implemented through an ongoing review and rewriting of existing regulations and procedures, by reviewing the responsibilities of agencies having jurisdiction within Napa County, by initiating action to create new agencies where needed and by promoting public awareness of the Plan.

Use of the Plan in the decision making process is an important aspect of its implementation. The value of this Plan as a basis for decision making is dependent upon its use as one policy to be considered with other plans relating to Napa County.

A large number of local and area-wide agencies are currently implementing their own programs for one or more elements of a total conservation program. Each of these agencies should be identified as to their organization, area of responsibility and program coverage, program capabilities and authority and the relationship of their program to the area.

Key programs and agencies should be singled out for special attention in terms of program coordination, cooperation and participation.

FIGURE 83: POTENTIAL COUNTY-WIDE SIGNIFICANCE OF OPEN SPACE LAND CATEGORIES

OPEN SPACE CATEGORY	PLANNING AREA													
	WEST ST. HELENA UPLANDS	YORK-WEST CALISTOGA UPLANDS	KIMBALL-BELL SCHWARTZ	POPE VALLEY	KNOXVILLE	BERRYESSA	HENNESSEY	MILLIKEN-RECTOR	CURRY, SUISUN, MADIGAN	NAPA VALLEY	DRY CREEK	NAPA S. E.	NAPA RIVER DELTA-CARNEROS	AMERICAN CANYON
X = PRIME SIGNIFICANCE / = SIGNIFICANT BUT NOT PRIME 0 = LITTLE OR NO SIGNIFICANCE														
1-OPEN SPACE FOR PRESERVATION OF NATURAL RESOURCES														
A-PRESERVATION OF PLANT ANIMAL LIFE	X	X	/	X	/	X	X	/	/	X	/	/	X	/
B-HABITAT FOR FISH	X	X	/	X	0	X	X	X	/	X	/	/	X	/
C-HABITAT FOR WILDLIFE SPECIES	/	/	X	X	/	X	X	/	X	X	/	/	X	/
D-AREAS REQUIRED FOR ECOLOGICAL & OTHER SCIENTIFIC STUDY PURPOSES	0	0	X	X	X	X	/	0	0	/	0	0	X	0
E-RIVERS	0	0	0	0	0	0	0	0	0	X	0	0	X	0
F-STREAMS	X	X	/	X	0	X	X	X	/	X	/	/	/	/
G-BAYS	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H-ESTUARIES	0	0	0	0	0	0	0	0	0	0	0	0	X	0
I-LAKESHORES	0	0	0	0	0	X	X	X	X	0	0	0	0	0
J-BANKS OF RIVERS AND STREAMS	/	/	/	X	/	X	X	/	X	X	/	/	X	/
K-WATERSHED LANDS	/	/	X	X	X	X	X	X	X	/	/	/	0	/
2-OPEN SPACE USED FOR MANAGED PRODUCTION OF RESOURCES														
A-FOREST LANDS	X	X	X	/	0	0	/	0	0	0	/	0	0	0
B-RANGELAND	/	0	0	X	/	X	/	/	X	X	/	X	X	X
C-AGRICULTURAL LANDS	0	0	0	/	0	/	/	/	/	X	/	/	X	/
D-AREAS OF ECONOMIC IMPORTANCE FOR PRODUCTION OF FOOD OR FIBER	0	0	0	X	0	X	/	0	X	X	/	/	X	/
E-AREAS FOR RECHARGE OF GROUND WATER BASINS	/	/	/	0	0	0	0	/	/	X	/	/	/	/
F-AREAS IMPORTANT FOR MANAGEMENT OF FISHERIES														
1) BAYS	0	0	0	0	0	0	0	0	0	0	0	0	X	0
2) ESTUARIES	0	0	0	0	0	0	0	0	0	0	0	0	X	0
3) MARSHES	0	0	0	/	0	/	/	0	/	0	0	0	X	0
4) RIVERS	0	0	0	0	0	0	0	0	0	X	0	0	X	0
5) STREAMS	X	X	/	X	0	X	X	X	/	X	/	/	/	/
G-MAJOR MINERAL DEPOSITS	/	/	/	/	/	/	0	/	0	X	0	X	/	/
3-OPEN SPACE FOR OUTDOOR RECREATION														
A-OUTSTANDING SCENIC VALUE	/	X	X	X	/	X	/	/	/	X	/	X	/	/
B-OUTSTANDING HISTORIC VALUE	0	X	X	/	/	/	/	0	0	X	0	X	0	0
C-OUTSTANDING ARCHEOLOGICAL VALUE	0	/	0	X	0	X	/	0	/	X	/	X	/	/
D-PARK AND RECREATION PURPOSES	/	0	X	X	X	X	X	X	/	X	/	X	X	/
1) ACCESS TO LAKESHORE, BEACHES, RIVER AND STREAMS	0	0	0	X	/	X	X	X	X	X	/	X	X	/
E-LINKS BETWEEN MAJOR RECREATION AND OPEN SPACE RESERVATIONS INCLUDING:														
1) UTILITY EASEMENTS	/	0	0	/	0	/	/	0	0	/	0	/	0	X
2) BANKS OF RIVERS AND STREAMS	0	0	0	X	/	X	/	0	X	X	0	X	X	/
3) TRAILS	X	X	X	X	X	X	/	/	X	X	/	X	X	X
4) SCENIC HIGHWAY CORRIDORS	/	/	0	X	X	/	/	/	X	X	/	0	/	0
4-OPEN SPACE FOR PUBLIC HEALTH & SAFETY														
A-AREAS WHICH REQUIRE SPECIAL MANAGEMENT OR REGULATION BECAUSE OF HAZARDOUS OR SPECIAL CONDITIONS SUCH AS														
1) EARTHQUAKE FAULT ZONES	X	X	0	/	0	/	0	/	X	0	/	/	0	0
2) UNSTABLE SOIL AREAS	/	/	/	X	X	X	X	0	X	/	/	/	X	X
3) FLOOD PLAINS	0	0	0	/	0	/	0	0	/	X	/	X	X	X
4) WATERSHEDS	/	/	X	X	X	X	X	X	X	/	/	/	0	/
B-AREAS PRESENTING HIGH FIRE RISKS	X	X	/	X	X	X	/	X	/	0	X	/	0	0
C-PROTECTION OF WATER QUALITY AND WATER RESERVOIRS	0	/	X	X	X	X	X	X	X	0	0	0	0	0
D-PROTECTION AND ENHANCEMENT OF AIR QUALITY	0	0	0	X	0	/	0	0	/	X	0	/	X	/

4. APPENDIX

BIBLIOGRAPHY OF SOURCES FOR OPEN SPACE LANDS PLAN (SELECTED)

1. Natural Resources Land

A. Division of Mines and Geology.

1. Geological Map of California - Santa Rosa Sheet.
2. Mineral Resources in Napa County.
3. California Geology - Monthly Magazine
4. Bulletin #179 - Northern Coast Ranges and Klamath Mountains.
5. Bulletin #154 - San Francisco Bay Counties Guide-book.
6. Bulletin #158 - Evolution of California Landscape.
7. Bulletin #152 - Maganese in California, pp. 154-161.
8. Bulletin #134, Part 2 - Chromite Deposits - Coast Ranges, pp. 20-25.
9. Bulletin #191 - Mineral Resources of California.
10. Bulletin #129 - Iron Resources of California.
11. Bulletin #174 - Pumice, Pumicite and Volcanic Cinders in California, page 13, p. 30-31.
12. California State Mining Bureau - Quicksilver Resources, pp. 76-91.

B. Other

1. Bureau of Mines Information Circular 8252 - Mercury Potential of the United States.
2. Bureau of Mines Information Circular 8422 - Mineral Resource Valuation for Public Policy.
3. California Geothermal Resource Board - Economic Potential of Geothermal Resources in California.
4. Department of Water Resources - Bulletin #143 - 7 - Geothermal Wastes Resources.. Chapter IV, Appendix B (Selected References).
5. Department of Water Resources - Bulletin #160-70 - California Water Plan, pp. 86-90.

6. State Fact Finding Committee on Natural Resources, pp. 31-42, Geothermal Resources?
 7. U.S. Geological Survey Circular 647 - Classification of Public Lands Valuable for Geothermal Steam and Associated Geothermal Resources.
2. Agricultural Land
 - A. General Soil Map - U.S. Soil Conservation Service.
 - B. Soils Surveys and Land Use Planning - Soil Science Society of America.
 - C. Aerial Photo Interpretation in Classifying and Mapping Soils - U.S. Soil Conservation Service.
 3. Recreation Land
 - A. Bureau of Land Management - Public Lands Guides - Clear Lake, Cow Mountain Area.
 - B. Soil Survey and Land Use Planning - Soil Science Society of America.
 - C. Socio-Economic Study of Multiple Use Water Supply Reservoirs - Ralph Stone and Company.
 - D. Appraisal of Potentials for Outdoor Recreation Developments in Napa County, California - U.S. Soil Conservation Service.
 4. Watershed or Ground Water Recharge
 - A. Department of Water Resources Bulletin 99 - Recon. Report on Upper Putah Creek Basin.
 - B. Some studies from B.A.T.S. Stereoscopic Aerial Photos to determine slide areas and ground waters in Napa River and Suisun Marsh Watersheds.
 - C. U.S. Bureau of Reclamation - Evaluation of Water Yield Potential in East Putah Creek Watershed - July, 1970.
 - D. Eutrophication - A Review - Central Valley Regional Water Quality Control Board.
 - E. U.S.G.S. Basic Data Contribution #15 - Flood Prone Areas in the Napa River Drainage Basin, Napa County, California.

- F. U.S.G.S. Basic Data Contribution #25 - Precipitation Depth - Duration Frequency Relations - Isohyetal Map.
 - G. U.S.G.S. Basic Data Contribution #11 - Estimated Relative Abundance of Landslides.
 - H. U.S.G.S. - Aquifier Yield Maps.
 - I. U.S.G.S. - Storm Hydrographs for Small Streams.
 - J. U.S.G.S. - Susceptability of Ground Water to Pollution.
 - K. U.S.G.S. - Landslide Area Studies.
 - L. Subdivision Geological Reports
5. Wildlife Habitat
- A. Department of Fish and Game Reports, Wildlife - Soil and Vegetation Studies.
 - B. California Department of Fish and Game, Fish and Wildlife Plan.

PUBLIC HEALTH AND SAFETY

1. U.C. Seismographic Station - Computer Printout of Epicenters 1864-1966, Napa County, September 3, 1969.
2. Soil Conservation Service: Aerial Photo Interpretation.
3. U.S.G.S. - A.B.A.G. Bay Region Study, Basic Data Contribution #7: Faults That are Historically Active or Show Evidence of Geologically.
4. U.S.G.S. - Environmental Planning and Geology.
5. U.S.G.S. - Basic Data Contribution #7: Bay Area Active Fault Map.
6. U.S.G.S. - Basic Data Contribution #9: Preliminary Map of Historic Margins of Marshland.
7. U.S.G.S. - Basic Data Contribution #11: Estimated Relative Abundance of Landslides.
8. U.S.G.S. - 100 Page draft of open file report on landslide photo interpretations by Tor Nilsen.
9. University of California: Earthquake Hazard in the San Francisco Bay Area.
10. Division of Mines and Geology, Mineral Information Service, March, 1970: Santa Rosa Earthquakes of October, 1969.
11. U.S.G.S. Basic Data Contribution 54: Preliminary Geological Map of Solano County and Parts of Napa County, 1973.

SEISMIC SAFETY



GENERAL PLAN

SEISMIC SAFETY ELEMENT

TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	251
2. Natural Conditions	253
3. Risk	282
4. Goals and Policies	286
5. Appendix.....	290

FIGURES

84. Pacific Plate Rotation	253
85. Faults	255
86. Selected Geologic Cross Sections in Napa County	256
87. Prominent Earthquakes in California 1769-1971 ...	257
88. Diagram of Earth Movement	261
89. Earthquake Magnitude and Intensity	263
90. Earthquake Magnitude (Richter Scale), 1944-1965	264
91. Relative Stability of Undisturbed Slopes	268
92. Landslide Costs	271
93. Liquefaction	272
94. Liquefaction Potential	274
95. Historic Marshlands	276
96. Ultimate Settlement in Mud	277
97. Time Taken for Settlement in Mud	278
98. Water Impoundments	280
99. Property and Life Risk Due to Earthquakes	283
100. Geologically Hazardous Areas	284
101. Felt Reports in Napa County, 1864-1969	292

1. INTRODUCTION

The Seismic Safety Element, required by State law, is one of the most obvious applications of the "health, safety and welfare" concern of government. The State of California has been involved with the problem for several decades.

State regulations with regard to building and earthquake shaking was begun following the 1933 Long Beach earthquake. The Field and Riley Acts were passed that year and the State Office of Architecture and Construction was established under the Department of General Services. The Field Act (Education Code Section 15451-15466) placed the design of schools under the direct supervision of the Office of Architecture and Construction. The Riley Act (Health and Safety Code Section 19100-19170) placed design requirements on other buildings used for human occupancy except dwellings designed for two families or less. The requirements of this act are enforced by county building officials.

More recently, planning laws have been used as a method for reducing earthquake damage. In 1971, the State enacted legislation requiring cities and counties to include a seismic safety element in their general plans (Government Code Section 65302). This element consists of "an identification and appraisal of seismic hazards such as susceptibility to surface ruptures from faulting, to ground shaking, to ground failures, or to effects of seismically induced waves such as tsunamis and seiches."

(Calif. Div. of Mines and Geology, 1973)

Legislation now requires mapping and evacuation planning for areas subject to possible inundation caused by dam failure. The Alquist-Priolo Geologic Hazard Zones Act of 1972 provides that the State shall delineate "special studies zones" along active earthquake faults, and within these zones land subdivision and development shall be conditioned upon the results of detailed geologic investigation. This Seismic Safety Element provides information which enables the public to become familiar with seismic problems, and provides a data base on which local government can base land use decisions which mitigate the hazards in the interest of the health, safety and welfare of the general public. This report describes the natural conditions which create ground shaking and related phenomena, and the consequent risks to life and property, and recommends measures to minimize these risks.

Several of the hazards discussed in this Seismic Safety Element are of undetermined extent, and the precise mapping of possible hazards will have to wait on more detailed investigations than those performed to date. The recommendations included in this Element are those which appear to be prudent judgments based on currently available information. Where uncertainty exists in a matter such as this, it is probably better to overestimate the possible hazard and avoid it than to do less and risk a disaster. The authority exists for local government to zone land for open space to protect the health and safety of the general public.

Large scale reproductions of the maps in this report are available for inspection in the Environmental Planning Section of the Napa County Conservation, Development and Planning Department. These maps are a general guide to seismic characteristics. They are not intended for and are not suitable for use for site characteristic evaluation.

2. NATURAL CONDITIONS

In the geologist's view the earth's surface is much more changeable than in the view of the layman. Mountains rise and erode, rivers change course, seas appear and vanish, polar regions change and the earth's crust moves. The layman can visualize the crustal movements because they often precipitate violent earth shaking; many have occurred in California within our short history.

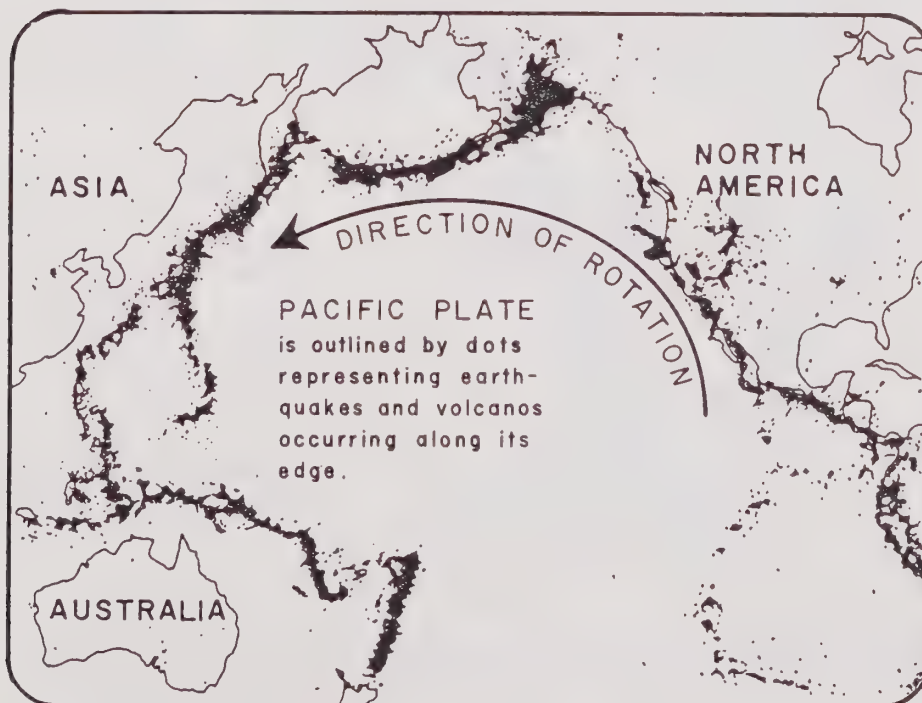
A. STRUCTURAL GEOLOGY

Most geologists believe that the earth's entire surface down to a depth of 45 miles is made up of a mosaic of massive plates that move in relation to each other. The plates ride and slide on a layer of plastic rock about 80 miles thick. The largest is the Pacific Plate, which extends from Japan to the west coast of the United States and from Alaska southward many thousands of miles.

The Pacific Plate is moving faster than the others and seems to dominate the earth-rotation effect among the plates...it is diving under the Aleutian Islands and under Japan...scraping past California along the San Andreas Fault.

(California Geology, June 1974)

FIGURE 84: PACIFIC PLATE ROTATION



Source: Tri-Cities, 1973)

As the Pacific Plate turns, ever so slowly, the Pacific Coast west of the San Andreas Fault moves northwest, sliding past the rest of the State of California. The movement occurs gradually, at a creep, in some places along the San Andreas and parallel faults. But in some places, notably Northern California, it tends to get "hung up" and moves only when the accumulated strain overcomes the inherent resistance.

It is the commonly held theory that when the strains become too great within the earth's crust, then rupture will take place. A sudden rupture generates seismic waves which constitute an earthquake. This rupture, normally termed faulting, will occur along the weakest zone in the earth's crust. This weakest zone is normally one which has had previous movements on it, and this zone is called a fault zone. The point beneath the earth's surface where the faulting first starts is defined at the focus, while the point on the earth's surface directly above the focus is the earthquake's epicenter.

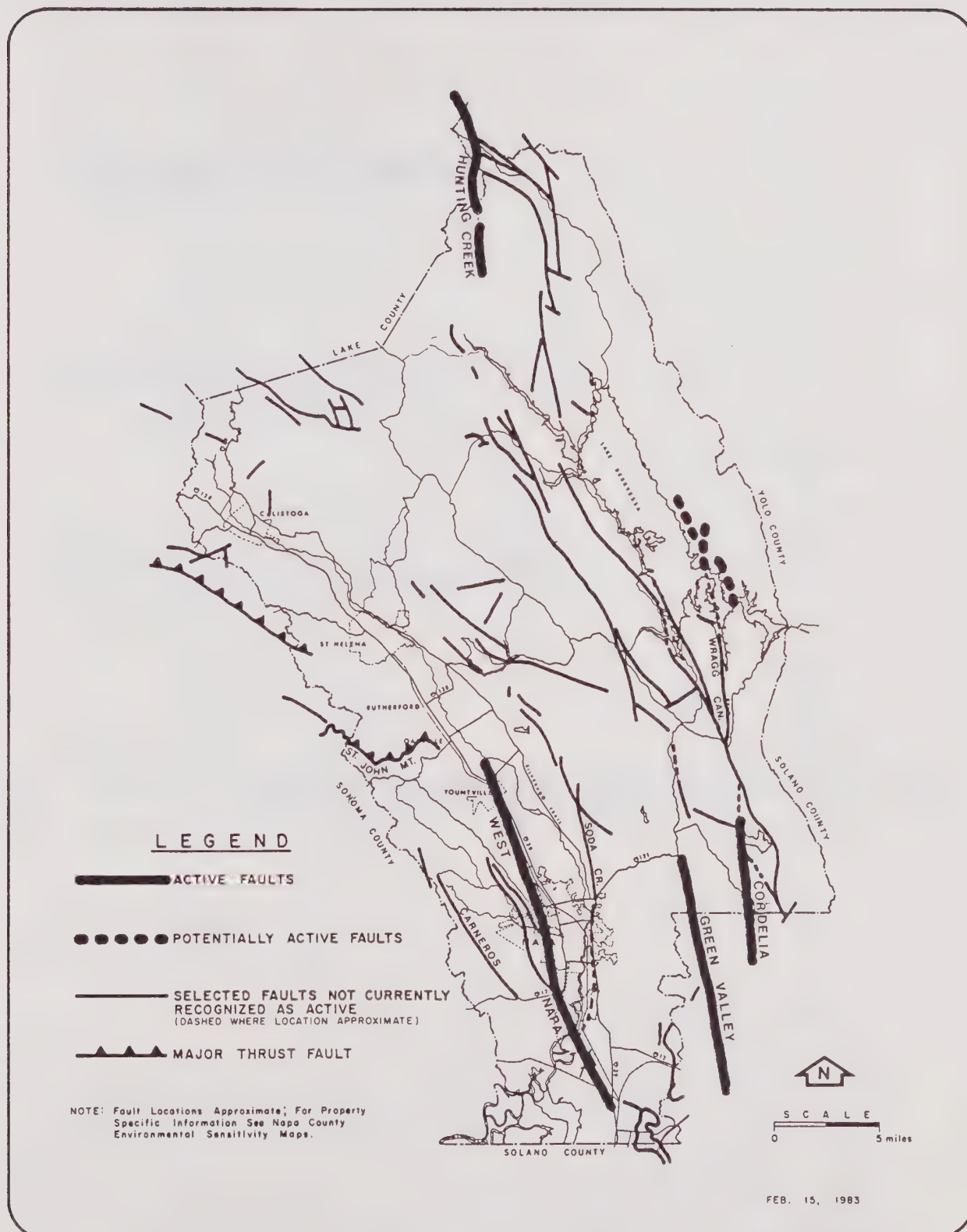
(Steinbrugge, 1969)

The geologic and historic record, and the evidence of accumulating strain, indicate that earthquakes are certain to recur on this portion of the San Andreas Fault. Seismic quiescence and lack of creep may indicate the accumulating strain is not being released by small events as it is elsewhere. The segment of the fault involved in the 1906 quake is characterized by infrequent great earthquakes and is one of the most likely areas for such an event to recur.

(Allen, 1968)

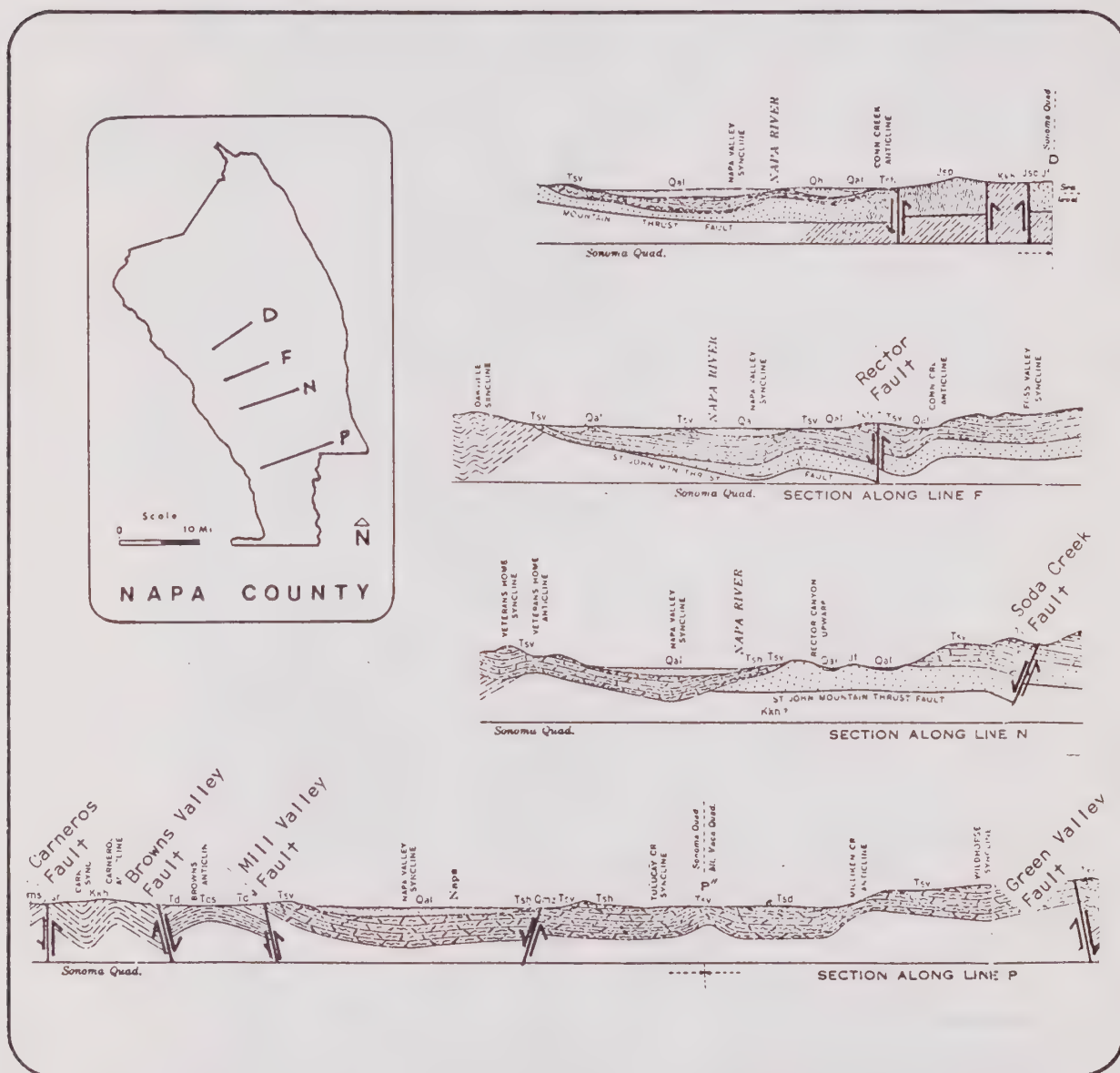
Suspected faults in Napa County (See Figure 85) roughly parallel the northwest-southeast course of the San Andreas Fault, which, at its closest point, is about 30 miles southwest of the City of Napa. Three main active faults have been identified within Napa County. From east to west they are the Cordelia, Green Valley and West Napa faults. The Hunting Creek Fault, a fourth active fault shown in Figure 85, is a possible northward extension of the Green Valley Fault. Based on fault length it is estimated that the three main faults involved are capable of producing earthquakes with a Richter Magnitude of up to 6 3/4. Such an earthquake, which is considered a moderate-sized event, is capable of producing a substantial amount of damage, even to wood framed structures.

FIGURE 85: FAULTS



SOURCE: C.DMG Preliminary Special Studies Zone Maps, 1983; USGS Miscellaneous Field Studies Map MF-881, 1977; USGS Basic Data Contributions 54 and 56, 1973

FIGURE 86: SELECTED GEOLOGIC CROSS SECTIONS IN NAPA COUNTY



Source: Weaver, 1949

B. RECORDED HISTORY OF EARTH MOVEMENT

California is in one of many regions of the world noted for having frequent earthquakes. It is situated along the edge of the Pacific Plate, whose periphery is called the circum-Pacific Seismic Belt or the Rim of Fire, for its many earthquakes and volcanos. Figure 87 lists prominent earthquakes which have occurred in California since 1769. (A description of Richter magnitude and Mercalli intensity is found on page 262).

FIGURE 87. PROMINENT EARTHQUAKES IN CALIFORNIA, 1769 - 1971

Date	Region	Richter Magnitude	Modified Mercalli Intensity
28 Jul 1769	Orange County, near Irvine	*	
8 Dec 1812	Southern California.VIII-IX
21 Dec	Off coast of southern CaliforniaX
10 Jun 1836	Hayward fault, Berkeley.IX-X
Jun 1838	San Francisco region, San Andreas fault.X
10 or 11 Jul 1855	Los Angeles CountyVIII
9 Jan 1857	Fort Tejon-Carrizo Plain	Possibly 8	.X-XI
26 Nov 1858	San JoseVIII
Nov 1860	Humboldt BayVIII
3 Jul 1861	Near LivermoreVIII
1 Oct 1865	Fort Humboldt-Eureka area.VIII-IX
8 Oct	Santa Cruz MountainsVIII-IX
21 Oct 1868	Hayward.IX-X
26 Mar 1872	Near Lone Pine	Possibly 8+	.X-XI
19 Apr 1892	Vacaville.IX
21 Apr	Winters.IX
4 Apr 1893	Northwest of Los AngelesVIII-IX
20 Jun 1897	Near HollisterVIII
14 Apr 1898	Mendocino areaVIII-IX
22 Jul 1899	San Bernardino County.VIII
25 Dec	San Jacinto-Hemet areaIX
27 or 31 Jul 1902	Santa Barbara CountyVIII
18 Apr 1906	San Francisco region	8.3	.XI
28 Apr	Brawley, Imperial Valley	6-6.9	.VIII
28 Oct 1909	Humboldt County.	6+	.VIII
11 Jan 1915	Los AlamosVIII
22 Jun	El Centro-Calexico-Mexicali area	6.25	.VIII
21 Apr 1918	San Jacinto-Hemet area	6.8	.IX
21 Jun 1920	Inglewood.VIII
10 Mar 1922	Cholame Valley	6.5	.IX
29 Jun 1925	Santa Barbara area	6.3	.VIII-IX
22 Oct 1926	Monterey Bay	6-6.9	.VIII
20 Aug 1927	Humboldt BayVIII
4 Nov	West of Point Arguello	7.5	.IX-X
25 Feb 1930	Westmorland.	5.0	.VIII
1 Mar	Brawley.	4.5	.VIII
6 Jun 1932	Humboldt County	6.4	.VIII
10 Mar 1933	Near Long Beach.	6.3	.IX
7 Jun 1934	Parkfield.	6.0	.VIII
18 May 1940	Imperial Valley.	7.1	.X
30 Jun 1941	Santa Barbara-Carpinteria area	5.9	.VIII
15 Mar 1946	North of Walker Pass	6.25	.VIII
29 Jul 1950	Imperial Valley.	5.5	.VIII
21 Jul 1952	Arvin-Tehachapi.	7.7	.XI
22 Aug	Bakersfield.	5.8	.VIII
25 Apr 1954	East of Watsonville.	5.25	.VIII
21 Dec	Eureka	6.6	.VII
12 Sep 1966	Truckee.	6.6	.VIII
8 Apr 1968	Northeast San Diego County	6.5	.VII
1 Oct 1969	Santa Rosa	5.7	.VII-VIII
9 Feb 1971	San Fernando	6.5	.VIII-XI

(Source: Calif. Div. Mines & Geology, 1971)

Earthquakes strong enough to cause damage have occurred about 12 times per century in the San Francisco Bay Area. The past history of these earthquakes shows no predictable pattern as to time, strength or location. Measured accumulating strains in the earth's crust indicate the inevitability of future earthquakes in this area. At present, earthquakes cannot be predicted as to time, place, or severity. However, based on all available

evidence, it is reasonable to expect a large earthquake in the San Francisco Bay Area once in every 60 to 100 years...This frequency is sufficient to require that all structures...be designed to resist the effects of a great earthquake.

The time distribution of major earthquakes is not at all uniform. This has also been noted elsewhere in the world on a larger time scale. For example, the time distribution of Japanese earthquakes since 684 A.D. has three periods of great seismic activity, with periods of lesser seismic activity between. This uneven time distribution is an important additional unknown in the estimation of earthquake frequency based on the historical record.

(Steinbrugge, 1969)

Napa County has experienced only three large (VII or more on the Mercalli Scale) earthquakes in recorded history, none of which apparently had its epicenter within Napa County. While structural damage caused by these three earthquakes was considerable, there is no record of loss of life as a consequence of seismic activity in the County.

The following are accounts of Napa County's three largest earthquakes; a complete list of local earthquakes is in Appendix A. The descriptive information is taken from local newspapers.

October 11, 1891

Time: 22:28

Epicenter - 38-1/2 latitude, 122-1/2 longitude

Intensity: VII-VIII (See page 13 for definition of intensity)

Felt Report: Napa

Between 9:00 and 9:30 PM, a light shock was felt. At 10:28 PM, a rumbling noise was heard, followed immediately by "probably the severest earthquake that has ever been experienced in Napa." "The vibrations seemed to be from northwest to southeast and lasted from 10 to 12 seconds. People generally were very frightened, and hundreds sought refuge in the streets."

"At intervals during the night other shocks were experienced, numbering about twenty, three of which were quite heavy."

Damage was extensive. Numerous chimneys were toppled and many more had to be pulled down because of damage. Most serious damage done was in downtown. Eddington Block had its walls forced out from the roof several inches. The reading room of the Palace Hotel was separated from the main building about an inch. At the asylum the damage was considerable, several towers were wrenched and cracked and had to be pulled down...

Napa, Santa Rosa and Petaluma apparently hardest hit... Relatively light in upper Napa Valley.

On October 4, there was another heavy shock at 4:30 AM followed by several lighter ones. Apparently, this did some further damage to already weakened buildings.

March 30, 1898

Time: 23:44
Epicenter - 38 latitude, 122 longitude
Intensity: VII-IX

Felt Report: Napa

The major shock occurred at 11:44 PM, and was followed by four of five smaller shocks before daylight.

Structural damage throughout the city was extensive. Nearly all chimneys damaged. The Court House severely damaged -- large fissure in the corners near upper cornice; plaster moulding thrown down inside, and bricks fell through the ceiling.

The Migliavacca Wine Cellar lost 6,000 gallons of wine when the wine tanks were upset and timber supports were splintered by the quake.

The abutments of the Third Street bridge were moved toward the river. Ornaments, bricks, cornices on the top of buildings were thrown down.

The weather vanes of the steeples of the Court House and Presbyterian Church were bent in the direction of the shock.

The shock was felt very strong by the crew of the Steamer Napa City as it rounded Jack's Point.

The shock was felt throughout the San Francisco Bay Area. Extensive damage was done to Mare Island. The shock was heavy at St. Helena but no great damage was reported from up valley.

April 18, 1906

Time: 5:15

Epicenter - 38 latitude, 123 longitude

Intensity: XI (at epicenter), VIII-IX (at Napa)

Felt Report: Napa

The shock lasted for about forty seconds, the vibrations seemed to trend north to south. Extensive damage was done throughout the city. The roof and veranda of the Revere House completely collapsed.

The south brick wall of the Napa Opera House toppled over onto the annex of the Napa Hotel.

The west wall of the Hayes Theater collapsed and fell into Coombs Street. The brick wall of the second story of the W. W. Thompson Building fell down.

The Superior Court Room in the Court House was considerably damaged.

The 30,000 gallon Southern Pacific water tank near the East Napa depot was hurled to the ground. Several houses were moved off their foundations as much as three feet. In the following days many structures were condemned, including City Hall.

C. GROUND SHAKING

One of the root causes of earthquake damage is the ground shaking ~~that~~ occurs following rupture of the earth's crust. The energy that is released as the earth's crust moves at the earthquake focus is transmitted as elastic waves up through the bedrock to become a series of complex waves or oscillations in surficial materials.

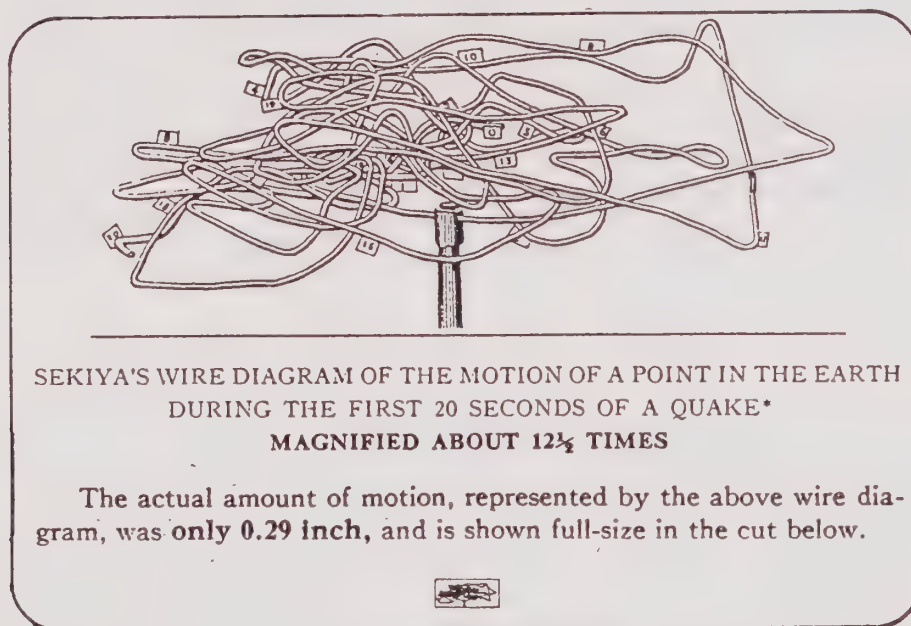
These oscillations may be extremely irregular, rapidly changing in direction, amplitude and acceleration.

Although the word "wave" is often used in describing earthquake motion, this movement at the scene of destruction is very different from a wave in and near the surface of water.

(Freeman, 1932)

Figure 88 indicates the complexity of the accelerations that are transmitted through the bedrock, and give some insight as to the problem involved in predicting the character of ground shaking.

FIGURE 88: DIAGRAM OF EARTH MOVEMENT



(Source: Freeman, 1932)

The energy transmitted by these waves or oscillations is transmitted from a largely elastic material (bedrock) to a material of mixed elasticity/plasticity (soil) and causes ground shaking. The frequency, magnitude, direction and duration of ground shaking depends upon the amount and character of energy being transmitted and the depth and character of the surface material being shaken. Most soils and rocks have elastic properties up to certain levels of stress; which is to say they will rebound or bounce back to their original position if the stress load isn't too great. But if the stress load of an earthquake is too great, the soils and rocks will deform. Predicting what will happen is most difficult.

Theoretical models to predict surface ground motion...require detailed knowledge of geologic and soil conditions...(and) their use has been fairly expensive and limited as a predictive tool to anticipate the effects at a single site... These techniques are still in the developmental stage; (but with) increasing sophistication in analysis, along with expanding knowledge of earthquakes and their mechanism, may...eventually (be applied to general land use problems).

In the meantime, the very broad generalized approach in characterizing the firmness of the ground appears to be adequate to assess the gross effects of ground shaking for general planning purposes. Where intensity maps representative of expectable earthquakes exist or can be prepared by modern techniques, they would be valuable for general plan purposes and for specific plans such as an urban renewal program or a large-scale redevelopment proposal. On the other hand, builders of proposed structures that are critical or that will have high occupancies might be required to have a dynamic analysis prepared of the structure and site as a means of assessing their safety and design.

(U.S.G.S. 1974 Circular 690)

The severity of an earthquake can be expressed in several ways. The magnitude of an earthquake as expressed by the Richter Scale, is a measure of the amplitude of the seismic waves and is related to the amount of energy released - an amount that can be estimated from seismic recordings. The intensity, as expressed by the modified Mercalli Scale, is a subjective measure which describes how severe a shock was felt at a particular location. Damage or loss of life and property is another measure and is ultimately the most important of an earthquake's severity.

The Richter Scale is best known for measuring the magnitude of earthquakes. The scale is logarithmic so that a recording of 7, for example, signifies a disturbance with ground motion ten times as large as a recording of 6. A quake of magnitude 2 is the smallest quake normally felt by humans. Earthquakes with a Richter value of 6 or more are commonly considered major in magnitude.

The modified Mercalli Scale is used to measure the intensity of an earthquake's effect in a given locality in values ranging from I to XII.

While magnitude and intensity aren't directly comparable, they are related in the manner shown below.

FIGURE 89. EARTHQUAKE MAGNITUDE AND INTENSITY

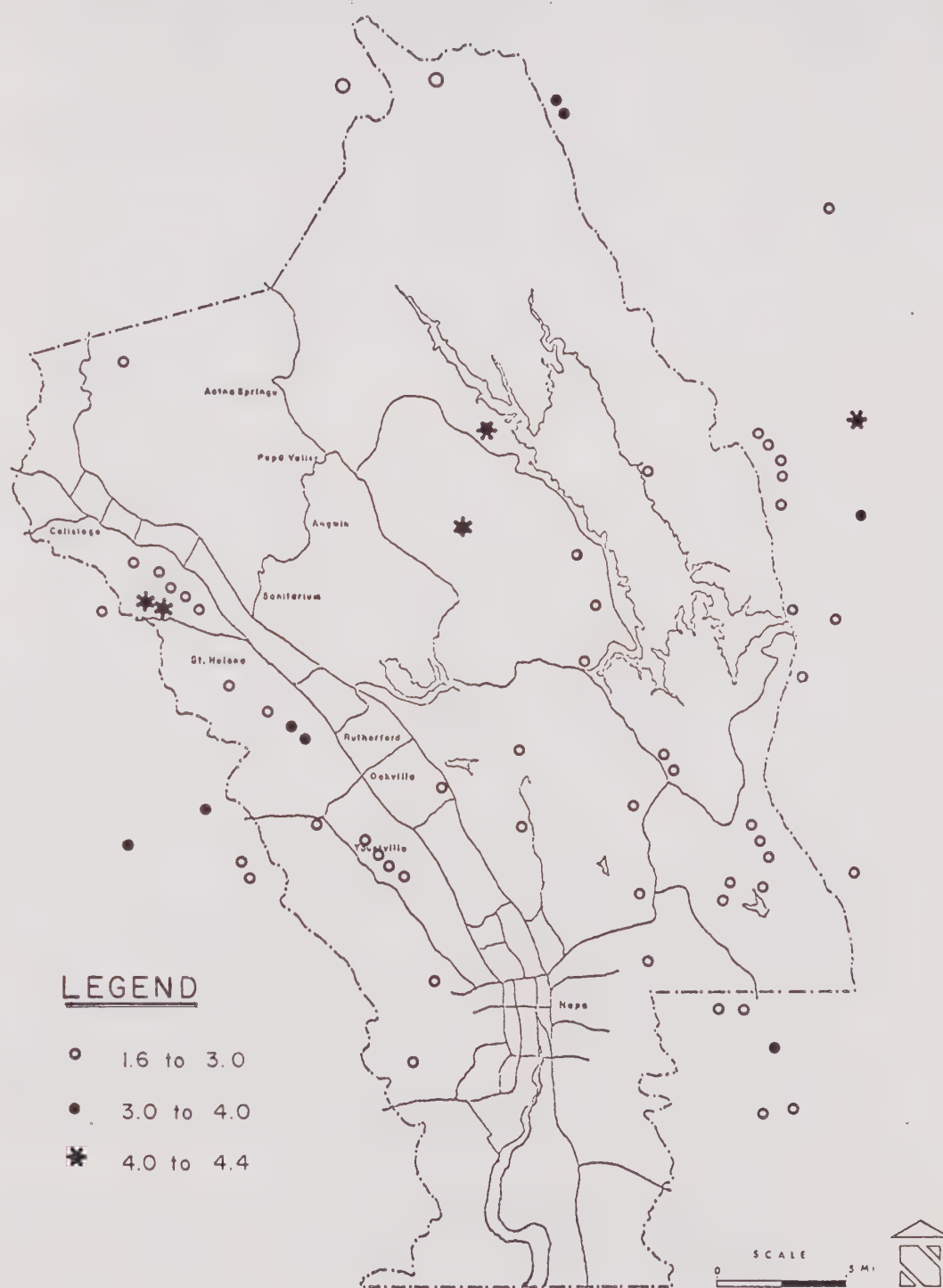
Richter Magnitude	Expected Modified Mercalli Maximum Intensity (at epicenter)	
2	I-II	Usually detected only by instruments
3	III	Felt indoors
4	IV-V	Felt by most people; slight damage
5	VI-VII	Felt by all; many frightened and run outdoors; damage minor to moderate
6	VII-VIII	Everybody runs out- doors; damage moderate to major
7	IX-X	Major damage
8 +	X-XII	Total and major damages

It is believed (Richter, 1958, p. 363) that there is an upper limit to expectable earthquake magnitudes. This is because rocks have limited strength and can withstand only finite amounts of strain before rupture. Housner (1970) states that it is most unlikely an earthquake in California will exceed a magnitude of 8.5 on the Richter Scale. Geologists have estimated recurrence intervals of earthquakes on the San Andreas Fault on the basis of strain rates and geologic data. Such estimates vary widely with the estimated strain accumulation and release rates. Wallace (1970) has estimated a recurrence interval of between 50 and 200 years for a magnitude 8 earthquake occurring somewhere along the entire length of the fault.

For planning purposes it is necessary to assume that damaging and possibly great earthquakes will affect the study area during the useful life of structures. To do otherwise would incur unacceptable risks because of great damage that would be inflicted. These assumed earthquakes may occur not only along the San Andreas Fault but also along (nearby) faults.

(Huffman, 1972)

FIGURE 90: EARTHQUAKE MAGNITUDE (RICHTER SCALE) 1944-1965



Source: U.C. Berkeley Seismographic Station

The Survey's Earthquake Information Service noted that "seismic activity is episodic. If the seismic activity were to remain at a low level for a long period of time along faults that are experiencing stress buildup, then there could be cause for concern. The stresses would eventually exceed fault strength, and a large earthquake could result."

(Calif. Div. Mines and Geology, June 1974)

Prior to the San Fernando earthquake, it seemed to seismologists, on the basis of a half-century of study, that "the forces generated by the 1906 San Francisco earthquake appeared to be a reasonable upper limit" (Steinbrugge, 1969). On the basis of information at hand, the Uniform Building Code had been revised thirteen times since 1927. But the highest earth shaking force for which the Code had counter-measures was below that recorded during the San Fernando earthquake.

The closest strong-motion instrument to the epicentral region...registered the highest earthquake horizontal accelerations ever recorded; 104% of gravity for the greatest single pulse with a number of other peak accelerations being in the 50% to 75% of gravity range. (By "percent of gravity" is meant the earthquake force as a percentage of the value of gravity force; a vertical acceleration of over 100%, for example, could throw objects into the air).

(Steinbrugge, 1971)

Prior to the San Fernando earthquake the Building Code required conventional one-story rigid structures to withstand horizontal forces (including safety factors) approximating 25% of the force of gravity. Horizontal forces in the San Fernando earthquake were three to four times greater than what the code required a building to withstand.

Following the San Fernando earthquake the Uniform Building Code was revised again; but the disquieting fact is that an undetermined number of buildings built prior to 1972 do not meet today's earthquake code.

Whether or not the San Fernando earthquake was the most violent occurrence to be expected is unanswerable at this time. Seismologists and structural engineers have to make

predictions based on past experience and we might expect that future damage and future analysis will result in future changes in the seismic hazard section of the Uniform Building Code. Much more information on the behavior of soils and structures is needed. Some information on the response of local soils to earth tremors could be gleaned from strong-motion accelerographs...

...which are a type of seismological instrument. This strong-motion equipment operates only when it receives a strong earth motion, it then records this strong motion for a period of time long enough to adequately record it, and then finally shuts itself off. The equipment may be installed in buildings, on dams, on significant soil types, and wherever else a recording is wanted. Since the equipment operates only when triggered by strong motion, it may be many years before it obtains even one recording.

Strong-motion equipment has been installed in high-rise buildings in the City of Los Angeles since the adoption of a local ordinance on July 1, 1965. The ordinance applies only to new buildings, and thereby was not retroactive.

(Steinbrugge, 1971)

There are presently only two strong-motion accelerographs located in Napa County. These machines are part of a network of seismic monitoring devices reporting to the National Center for Earthquake Research, U.S.G.S., at Menlo Park, California.

D. GROUND FAILURE

Although the basic causes of ground instability are simple in concept, the consequences are often complex and highly variable. They include numerous varieties of landslides, ground cracking, lurching, subsidence, and differential settlement. Moreover, these types of ground failure occur on a wide variety of ground conditions. Landslides, for example, do not require a steep slope on which to form, particularly during earthquakes. Many occur on slopes that are virtually flat and the surface on which they fail may be very shallow (1 to 2 feet deep) or as much as hundreds of feet below the ground surface.

Ground cracking usually occurs in stiff surface materials and is associated with changes in surface topography or materials. For example, during the 1964 Alaskan earthquake, much of the ground cracking that occurred along river flood plains adjacent to stream channels and along road and railroad embankments resulted from differential movement owing either to liquefaction or to lateral spreading of a relatively soft, deeper layer under a stiffer surface layer. Cracks may be only hairline or several feet wide and from a few feet to hundreds of feet long.

Ground lurching may be both a transitory and permanent phenomenon. During earthquakes, soft saturated ground may be thrown into undulating waves that may or may not remain when the ground motion ceases.

(U.S.G.S., 1974, Circular 690)

Landslides - Landslides may be the most important seismic hazard within Napa County; because many portions of the County are susceptible and few structures can survive landslides. The prospect of building a structure to survive a sizable landslide is essentially that of creating an immovable object to withstand an irresistible force.

A given landslide may not necessarily have sharp boundaries, but rather it may grade into stable ground across a zone of creeping material. Many areas having compound and complex sliding as well as zones of creep may be too complicated to be delineated accurately. These areas have been described herein by the term "disturbed ground." They may have a few or several characteristic landslide features, but most zones designated as disturbed ground have indistinct boundaries with the surrounding undisturbed terrain. Some areas mapped as disturbed ground may represent the residual material from old landslides after their disintegration and nearly complete erosion.

The rate of advance is a function of several factors, some of which are the degree of saturation by the water, the shear strength of the earth materials, slope arrangement and form, the mass and thickness of the deposit, the mode of detachment, and the type and extent of vegetative cover.

The rate of downslope movement of landslide material ranges from tens of miles per hour in the case of mudflows to about one inch per year or less in less fluid materials. (Tri-Cities, 1973).

The map of Relative Stability of Undisturbed Slopes (Figure 91) is a compilation of information from several published and unpublished large scale landslide maps prepared by the U.S. Geological Survey. It indicates the apparent relative stability of broad areas of Napa County. The map probably overlooks many forest areas where the indicators of slope instability are obscured. The boundaries between areas could be made more precise following additional research, preferably by a geologist who could perform additional correlation work and prepare a map which could be accurate at a larger scale. The existing map indicates numerous areas of substantial landslide risk. Probably the most readily observable are on the hills south and east of Sossol Ridge. The casual observer on Route #29 can see numerous slumps and slides on the grass-covered hills east of Napa County Airport.

Land areas on the map of Relative Stability of Undisturbed Slopes are described by a shade pattern; the lighter the area, the more stable the ground. The map of Relative Stability of Undisturbed Slopes is generalized and is not suitable for use in site characteristic evaluation. For such an analysis, Napa County Environmental Sensitivity Maps should be used.

The Slope Stability Map represents an evaluation of the relative degree of downslope movement to be expected during a normal season. During a period of abnormally strong local energy input into the system, the affected areas should be "elevated" into lesser stable categories. For example, should fire destroy the vegetative cover along the slope of a ridge, soil would be exposed to the full force of seasonal rains. The slopes would be out of equilibrium with their environment and, therefore, would be more prone to sliding and other types of erosion. The decreased vegetative cover would also increase the potential for flooding in the valley areas. The burned area would be more likely to erode and slide until vegetative cover was re-established.

Because ground shaking during past earthquakes has contributed to the development of existing land forms, the relative slope stability groups reflect the response expected during future earthquakes. Since earthquakes reduce rock strength, remove rock support, and reduce rock cohesion, landslides will be generated in a variety of geologic materials.

(Tri-Cities, 1973)

Water-saturated ground is particularly susceptible to failure during an earthquake. Water may be injected along old slide planes; reactivating the slides. Liquefaction may occur in some saturated sand layers. If an earthquake ruptured water and sewage pipes, large quantities of water would be released into the ground. After-shocks, which are common to large earthquakes, could generate landslides in this newly saturated ground in the vicinity of the breaks.

The character of seismic shaking (intensity, duration, direction) and shape of underlying bedrock will determine the degree to which each of the above factors will affect ground stability.

The foregoing evaluation and the Slope Stability Map are developed specifically for natural slope conditions. Usually, any non-engineered cut made in any hillside reduces the stability of that slope. However, in some cases it is possible to manufacture a more stable slope by proper engineering evaluation and control throughout the slope-altering process.

The importance of adequate geologic investigation and proper engineering can hardly be overemphasized in the case of urban developments in landslide prone areas. The example shown in Figure 92 details the costs incurred by local governments in the process of repairing damage to development on landslide deposits.

Since the "state of the art" is imprecise, zoning for landslide hazard may be impractical at this time; and at best local governments could reasonably recommend avoidance of steep slopes as long as there is so much uncertainty as to where boundary lines should be drawn. For the time being, those areas for which there is reason to expect a significant hazard excepting Oat Hill, should be zoned for low (population) density uses or open space pending receipt of more definitive data that considers slope stability and sub-surface geology.

Overcoming the problems posed by landslides in urbanized areas can be extremely costly; for few structures are designed to withstand landslides, the cost being prohibitive. To determine in the aggregate how many structures in Napa County are endangered or subject to a high risk would be very costly. And to move or reconstruct all the endangered facilities and improvements would be to incur astronomical costs, in order to solve problems that can only be expressed in degrees of probability.

The options for Napa County are: (a) do nothing, and sustain an unknown amount of damage; (b) research the problem and rezone land at a possible cost of tens of thousands of dollars; (c) attempt some remedies for endangered structures, at a possible cost of hundreds of thousands of dollars; or (d) attempt a full remedy, at a possible cost of tens of millions of dollars.

FIGURE 92: LANDSLIDE COSTS

The economic loss as a consequence of development on these landslide deposits is already large, will continue to grow, and will probably become significantly greater if additional development is permitted without thorough engineering geology investigations of the area. The estimated 1969-70 loss in market value for all houses in San Jose Highlands, for example, was \$228,000, the loss for lots was \$195,000, and the loss in valuation for specific landslide damage to certain houses was \$61,520—a total loss of \$484,520 (Santa Clara County Assessor's Office, written commun., Sept. 22, 1971). The cost data below, provided by the San Jose Department of Public Works (written commun., Sept. 28, 1971), reveal the variety and magnitude of expenses to a municipality when landslide activity takes place within a subdivision area.

Actions taken by and financed by the City of San Jose
in the San Jose Highlands area, 1968-71

Soils study and consultant fees	1968	\$ 10,000
Soils study and consultant fees	1969	10,000
Consultant for new road	1970	30,000
Construct 1,400 foot gravel-fill interception ditch (no water was apparently removed).	1969	15,000
Clean Hydraugers several times		3,000
Construct dewatering wells (deactivated after 1 year, no apparent help).	1969	25,000
Above-ground flexible aluminum sanitary sewer ..	1968	4,500
Sewer photograph survey	1971	3,000
Replace sanitary sewer	1971	7,000
Aerial photography		2,000
Abandon 600 feet of only access road and build 4,000 feet of new access around landslide area		550,000
	1967	0
Winter and spring road maintenance to remove ground swells and increasing grade due to downward creep	1968	9,000
	1969	30,000
	1970	32,000
	5 months of 1971	30,000

Total \$760,500

Estimated value of city streets in San Jose Highlands
(exclusive of new access road) \$750,000

Estimated value of city utilities (street lights and sewers)
in San Jose Highlands \$300,000

Landslide damage to gas lines in San Jose Highlands totaled \$20,000 by late 1970 (Pacific Gas and Electric Co., written commun., Nov. 18, 1970). Landslide damage to water lines has become progressively worse according to the following figures provided by the San Jose Highlands Water Company (written commun., Nov. 3, 1971):

1967-68	(1 repair)	\$ 215
1968-69	(5 repairs)	\$1,570
1969-70	(7 repairs)	\$1,660
1970-71	(20 repairs)	\$5,816

No information was obtained on the cost of landslide damage in the map area outside of the San Jose Highlands, but landslides were a substantial and presumably costly problem during and after construction of terminal facilities for the South Bay aqueduct (California Department of Water Resources, 1966).

Source: U.S.G.S. Circular 690, 1974)

Source: U.S.G.S. Circular 690, 1974)

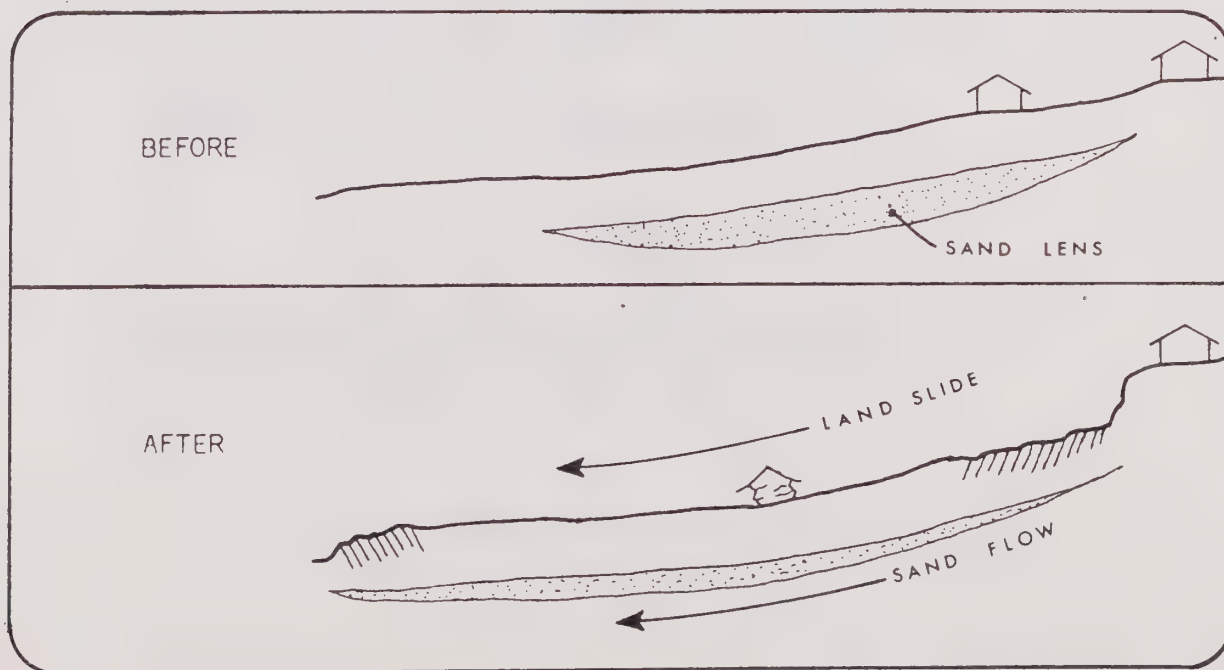
Liquefaction - Soils composed chiefly of sand are porous, that is they have voids around and between the particles. These voids may be filled with water, which is particularly true in alluvial valleys where sand deposited by streams in the geological past is unconsolidated and the water table is high. During an earthquake, the shaking forces which may last as long as a minute enable the sand particles to settle down and force the trapped water out. As this is happening, the sandy soil acts like a fluid, losing its "strength" or its stiffness. Soils in this fluid state are considered "liquefied" and structures built on these soils float, or sink, as though they were in quicksand. Liquefaction during an earthquake has caused buried septic tanks to float to the surface, automobiles to sink into the ground until they reach their "floating" point, and buildings to rotate off their foundations until they float with their center of gravity readjusted.

While "liquefaction of saturated sands is a common phenomenon" (Seed 1969), such extreme cases are rare and dependent upon deep layers of sand, high water table and severe shaking.

Further study is needed to determine the location and extent of sand deposits in Napa County that are susceptible to liquefaction. It would be a fair assumption that only the Quaternary alluvial deposits, such as locations along the Napa River would be suspected. (Fox, 1974)

If liquefaction occurs in or under a sloping soil mass, the entire mass...will flow laterally to the unsupported side in a manner similar to a plate sliding on a layer of ball bearings. (Seed, 1969)

FIGURE 93: LIQUEFACTION



Flow slides can affect huge areas and carry materials as far as a mile downslope. (Seed 1969)

While the steepness of slope is a factor which increases the chance of landslides, even gentle slopes can flow. In the San Fernando Earthquake a mass of land about one mile long, on a slope averaging 2.5% flowed when buried sand strata liquefied; and numerous structures on that flow were demolished.

(Steinbrugge, 1971)

Much of the newer urban development in Napa County is on steep slopes whose potential for landslide or flow slide is unknown. While no record of liquefaction (which could be confused with landslides) has been found in Napa County, there is reason to believe that the problem exists due to the alluvial nature of valley sediments. Assessment of the probability of occurrence of liquefaction in Napa County would be an expensive and time consuming task that would have to be performed by an experienced consultant or the appropriate State or Federal personnel.

Land Subsidence - Land surface elevations have been noted to subside in several places in California; but only one of the more pronounced types of subsidence has been observed in Napa County. The more extreme types of subsidence occur as a result of:

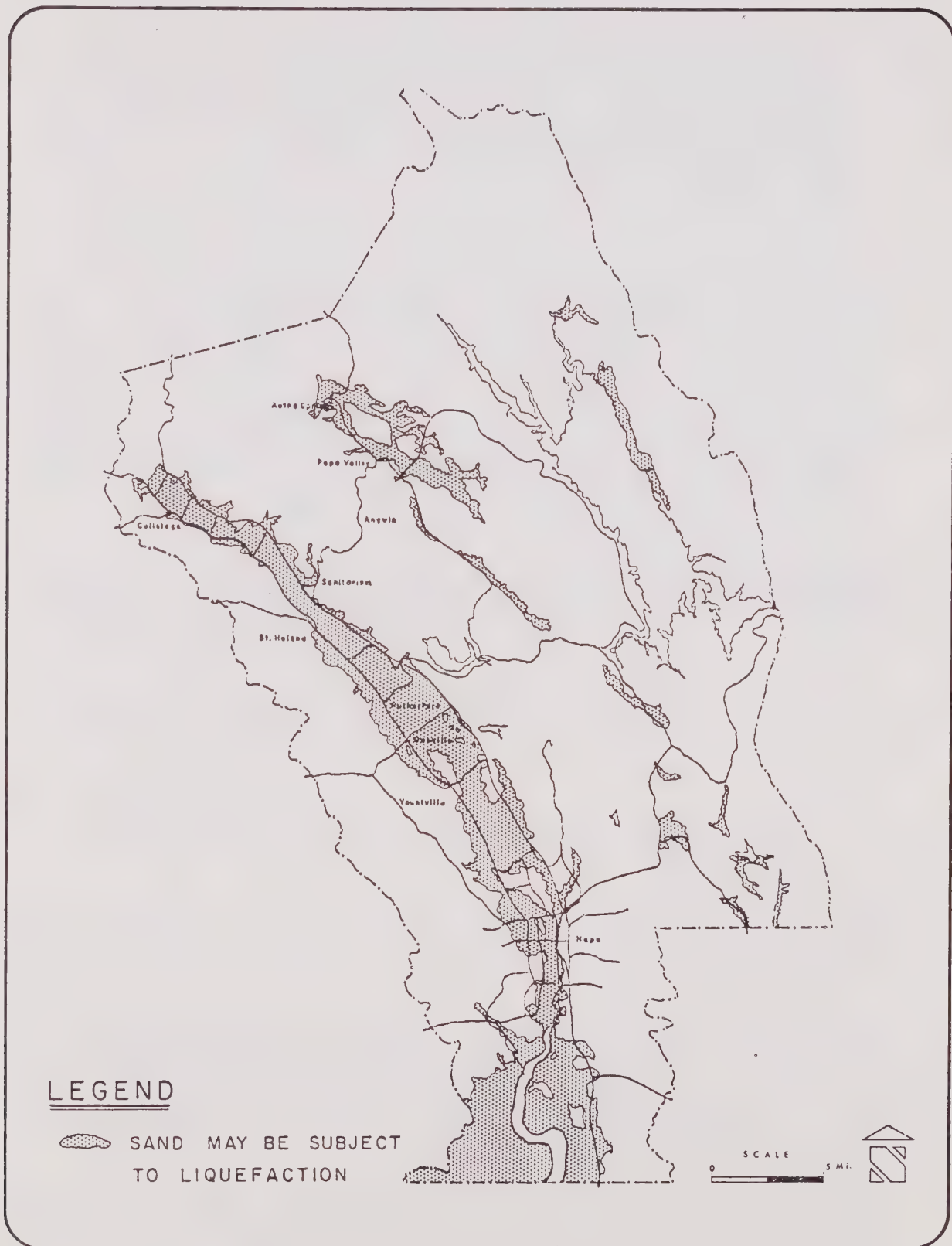
- a) oxidation of organic soils (common in the Delta area).
- b) pumping large quantities of oil or water (noted in Long Beach).
- c) compaction and plastic flow of water-saturated mud (common in San Francisco).

The Napa Valley is composed of alluvial deposits approximately 200 feet deep near Napa and deeper towards the Bay.

Because of the depth and conformation of alluvium in Napa Valley, land subsidence in Napa County is likely to be restricted to instant compaction of sands (as described in liquefaction section), or the long-term compaction and plastic flow of thick, water-saturated mud, for example, in the marshlands.

The marshland close to the Bay has largely been diked and drained. Upon drying out and compacting over the past

FIGURE 94: LIQUEFACTION POTENTIAL



Source: U.S.G.S.(1974) and C.D.M.G. (1963)

several decades these reclaimed areas have settled, some to as much as five (5) feet below sea level. (Calif. Div. of Mines, 1949)

One of the components of the alluvium under the marshland is...

...the organic clayey silt, generally referred to as bay mud, which is in an unconsolidated, semi-fluid state...

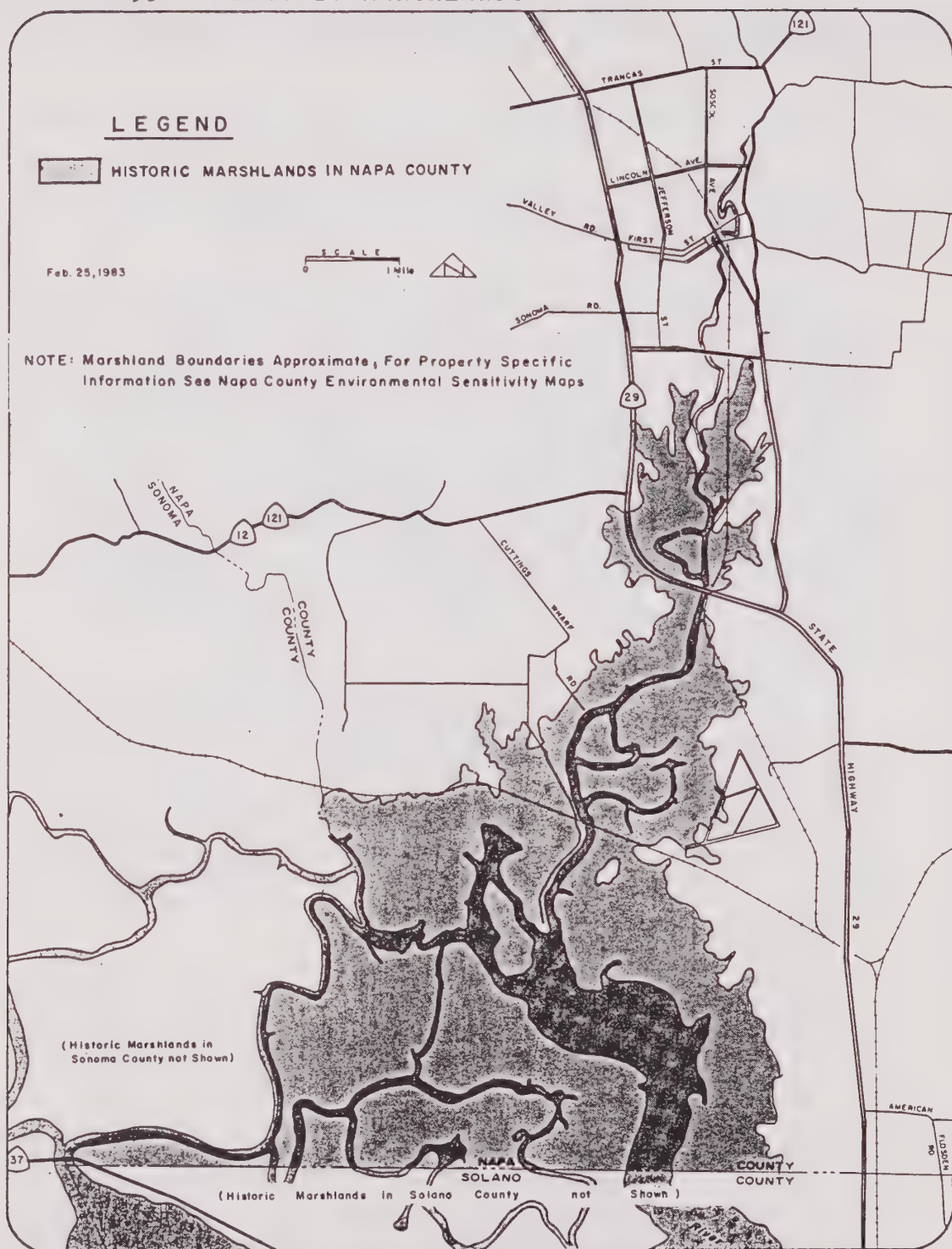
The upper layer of bay mud is largely derived from fine sediment deposited from local drainage waters. During the summer periods it dries out by evaporation and tends to consolidate. The 2 or 3 foot deep crust appears stiff enough to support building foundations; but beneath the crust is plastic, compressible mud. The voids in the bay mud, which are the spaces intervening between solid particles, are roughly twice the volume of the solid particles. Thus, a cubic foot of bay mud is made up of one-third of cubic foot of solid particles and two-thirds of a cubic foot of intervening space which is occupied by water or air.

Due to the fine texture of its grains and the jelly-like matrix, bay mud is known to be highly impermeable. It is common knowledge that clays, once saturated, can only be dried over a long period of time by squeezing out the water; contrasted to which is the behavior of granular sand which will readily give up its water. It is this phenomenon of relatively high impermeability of the bay mud that gives it its low strength and its incapacity to support appreciable loads.

In its pristine condition bay mud has reached a state of "continuing equilibrium," by which is meant that the natural process of consolidation under its own weight is approaching an asymptotic limit. The term consolidation simply implies a decrease in volume of a soil body by virtue of reduction of its voids which are filled with water and/or air. In order to decrease the volume of the voids, it is necessary to force the water and/or air out of them. An applied external pressure will help the process and accelerate it.

It can be easily visualized that upon the application of a superimposed load on mud, the entire load is momentarily transferred to and

FIGURE 95: HISTORIC MARSHLANDS



SOURCE: Compiled by Napa County Planning Department From Unpublished U. S. Geological Survey Maps.

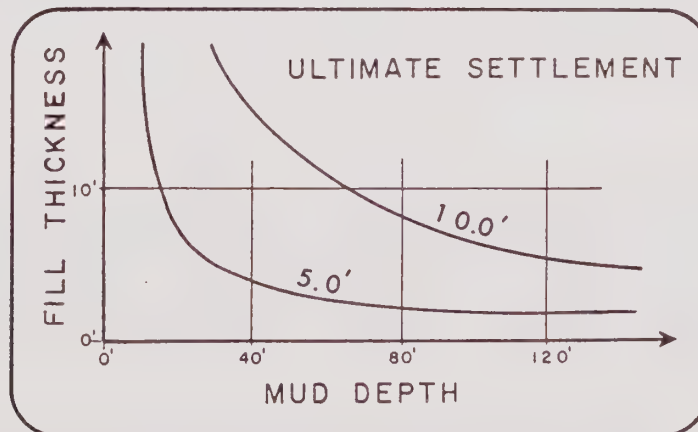
carried by the entrapped water. If the load is not too great and the application is slow, the water will manage to escape through the tiny pores and the solid grains will be forced to come closer together until they are in a position to carry some or all of the superimposed load. But if the load is great and it is applied suddenly, the high pore water pressures set up in the voids inhibit the soil from developing the shear strength required to prevent failure.

The above analogy is offered to explain in simple terms what has been known to the profession for a long time, namely The load-carrying capacity of bay mud depends upon the rate of loading. In common terms, the mud upon overloading bulges or produces mud waves while the filled areas sink. The mud is said to be in a state of plastic flow.

(Lee and Praszker, 1969)

Experience in the San Francisco Bay Area has shown a way to roughly calculate the settlement expected to occur in fill over bay mud. The range of settlement to be expected in Napa County may be from a few inches to about five feet, dependent upon the thickness of the fill and the depth of bay mud.

FIGURE 96: ULTIMATE SETTLEMENT IN MUD

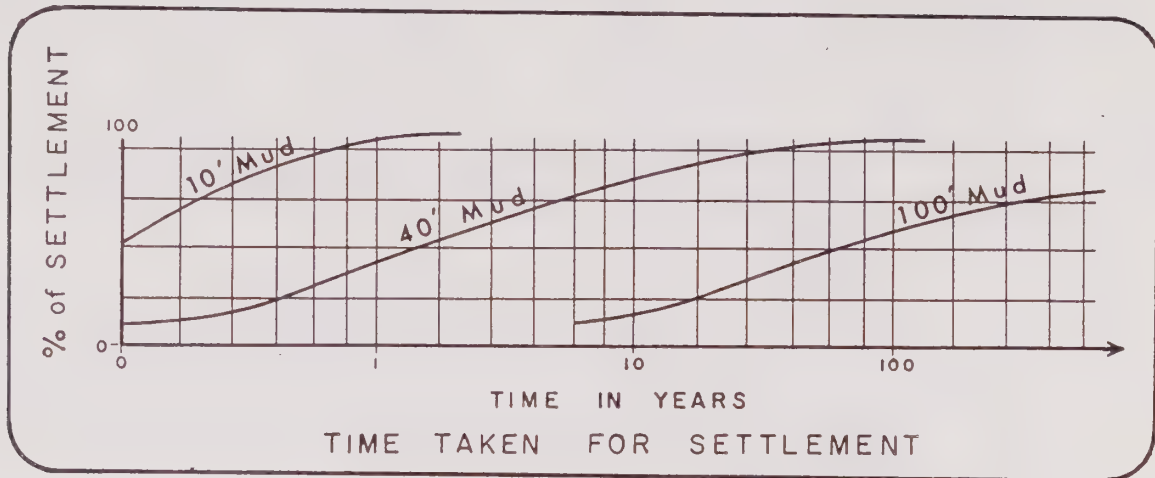


(After Lee and Praszker, 1969)

How long the settlement will take is largely dependent upon the depth of the mud.

The settlement process can be accelerated by adding an extra load to the fill area, "surcharging" the area.

FIGURE 97: TIME TAKEN FOR SETTLEMENT IN MUD



(After Lee and Praszker, 1969)

A process called surcharging is something used to reduce the amount of settlement which the complete fill will experience. A larger amount of fill is placed than is ultimately intended on the site. After enough time has passed for the water to be squeezed out of the mud, the excess fill is removed. The removal of the surcharge will leave the mud in a preconsolidated condition and further consolidation thereafter will be largely reduced if not entirely eliminated, depending upon the duration of the surcharge and other factors.

(Lee and Praszker, 1969)

Compressing bay mud in its original place is problematical arrangement. At the same time that it is settling, some of it is flowing ever so slowly, as "an uncontrollable jelly-like mass which may flow in any direction" (Lee and Praszker).

There is apparently no certainty that this plastic flow process (whereby elevated land masses over water saturated mud displace the mud and subside) won't occur during an earthquake. It is possible that during seismic conditions, masses of fill over bay mud may subside, perhaps unevenly, in such a way and to such a extent as to cause much damage to structures, utilities and streets.

That portion of Napa County which was marshland and tide flats prior to diking and draining is the land which would be most suspect in terms of possible subsidence. Any development in this area should be conditional upon

intensive geological investigation which would assess the consequences of subsidence, land waves, and the relation between the natural period of the ground and the fundamental period(s) of the structure(s).

E. FLOOD ZONES FROM DAM FAILURES

The State Office of Emergency Services has had inundation maps prepared for numerous impoundments in Napa County. It should be recognized that, from an engineering standpoint, inundation mapping methods are quite different from those used for flood plain studies.

The latter are more susceptible to precise analysis; particularly since engineering computations usually can be checked by years of records of actual floods. Inundation mapping, on the other hand, depends upon empirical analysis based on model studies, with very little actual historical data. Moreover, since the purpose of the inundation mapping is to provide a basis for evacuation planning, OES instructed the engineers to be conservative within the limits of good engineering judgment. It is evident, therefore, that if the maps are used for general planning purposes, the utmost caution should be exercised. (Written Communication OES, 1974). The OES inundation maps are hereby incorporated by reference into the Seismic Safety Element. Figure 106 in the Safety Element is an OES inundation map series for one water impoundment.

F. SEICHE

A seiche is an abnormally high fluctuation in the water level of a bay or lake which can be compared to the back-and-forth sloshing of water in a tub. Depending on the source, the fluctuation may be slight or extreme. Seiches caused by strong winds or changes in atmospheric pressure may measure in inches; whereas seiches caused by under-water earthquakes or landslides into the water have caused runups as high as 800 feet (vertical) above the normal water level. Such extreme cases are rare.

Assessing the probable hazard of seiches that might occur in the lakes and reservoirs in Napa County would require an engineering analysis that might be performed on a County-wide basis. Assessing the probable hazard of a seiche in San Pablo Bay would also require an engineering analysis; but that should be performed by regional, State, or Federal agencies. The populated areas of Napa County appear to be sufficiently elevated and removed from those areas that might be endangered by a seiche in San Pablo Bay.

Map of Napa County, California, showing 45 numbered locations. The map includes major roads, lakes, and surrounding counties (Colusa, Yuba, Sutter, Glenn, Butte, Tehama, Plumas, Sierra, Nevada, and San Francisco). A scale bar indicates 0 to 5 miles, and a north arrow is present.

1. Angwin
2. B. J. Robinson
3. Bell Canyon
4. Blanchard-Offner
5. Burns
6. Catacoula
7. Conn Creek Dam
8. Crystall
9. Davis
10. Deer Lake
11. Dick Weck
12. Duvall
13. Eastside Res
14. Henne
15. Kimball Creek
16. La Herpadura
17. Lake Berryessa
18. Lake Camille
19. Lake Curry
20. Lake Cynthia
21. Lake LaVerne
22. Lake Marie
23. Lake Noz
24. Linda Vista
25. Metcalf
26. Milliken
27. Moskowite
28. Newton
29. Olson
30. Orville
31. Rancho La Jota
32. Rector Creek
33. Red Lake
34. Robt. L. Matheson
35. Scotts Canyon
36. St. Helena Lower
37. St. Helena Upper
38. Terminal Storage
39. Thompson
40. Timberhill Lake
41. Upper Bohn
42. Usibelli No. 2
43. Veterans Home
44. White Head
45. Wine Lake

Source: California Dept. of Water Resources, 1971

Assessing the hazards from seiches is very difficult and subject to varying interpretations because of very limited historical data and theoretical knowledge. Nevertheless, wave runup elevations could be predicted for most river and reservoir shorelines from examination of historic records. An attempt should be made to assess the amplifying effect of unique topographical riverbanks and reservoir shoreline configurations even though the methodology may be very crude. Potential areas of catastrophic inundation from dam and reservoir failure or from landslide-generated waves that overtop dam crests can be mapped for all large bodies of water perched above populated areas.

(U.S.G.S., 1974, Circular 690)

Napa County has the potential for a most peculiar form of seiche. Napa Valley wineries store millions of gallons of fine wines in bulk tanks and stacked barrels; and guided tours near and through storage areas are a large tourist attraction. Remembering the loss to Migliavacca's Wine Cellar during the 1898 earthquake (Page 259), measures might be taken to assess the potential hazard given modern construction and storage techniques. A study of this sort might be done on behalf of all the vintners in Napa County.

G. TSUNAMIS

Large sea waves generated by earthquakes, traveling across oceans at hundreds of miles an hour and capable of causing waves cresting tens of feet high are called tsunamis. Since Napa County has no ocean frontage, save by the way of the Golden Gate, the problem should be slight. The U.S.G.S. has calculated that a tsunami that had a runup of twenty (20) feet at the Golden Gate Bridge would be negligible by the time it reached Napa County. At most, a few hundred acres of the southwestern tip of Napa County near Sonoma Creek would be inundated. A tsunami of that scale is likely to occur once in 200 years. (U.S.G.S., 1972, B.D.C. 52)

3. RISK

The available mapping of geologic hazards and faults is inadequate in California in general, and in Napa County in particular. Many of the available maps are too generalized for detailed use.

By expanding the coverage and scope of geologic hazards mapping, as a guide to local and regional planning efforts, we could ensure better land use decisions at all levels of government.

Emphasis should be placed upon:

- a. Distinctions among geologic faults in terms of nature and amount of displacement, recency and recurrence, periods of movement, seismic activity, and probable future surface offset.
- b. measurement of physical properties, aerial distribution and thickness of various rocks and surficial deposits, to determine their probable responses to strong shaking during an earthquake.
- c. Evaluations of the natural stability of slopes, effects of ground water conditions upon stability, and relationship of stability to expectable ground shaking.
- d. Correlation of earthquake intensity with duration and spectral characteristics of earthquake motion, based upon geologic conditions.

The scale of the possible risk of a regional basis, due to seismic hazards, may be inferred from Figure 99, which notes a total of about 1,000 lives and about \$7 billion dollars worth of property damage in "26 damaging earthquakes...in California...since 1812." Figure 99 also cites Algermissen's estimates as to the "probable results of a major earthquake in the San Francisco Bay Area." An assessment of risk to life and property in Napa County would require further study.

FIGURE 99: PROPERTY AND LIFE RISK DUE TO EARTHQUAKES

Losses due to earthquake shaking in California.

The largest losses of life and property in California due to geologic hazards have been caused by violent ground shaking during earthquakes. Earthquake shaking is largely due to the release of seismic energy during periods of sudden displacement along a fault. Since 1812 a total of 26 damaging earthquakes have struck California, inflicting a total life loss of 1,020 and dollar property losses in excess of \$1 billion in dollar values at the time of the earthquake, which amounts to more than \$7 billion in 1971 dollar value.

Date	Location	Lives lost	Dollar loss** at the time of the quake
1812...	San Juan Capistrano.....	40	--
1857...	Fort Tejon.....	--	--
1865...	San Francisco.....	--	500,000
1868...	Hayward.....	30	350,000
1872...	Owens Valley.....	27	250,000
1892...	Vacaville.....	--	225,000
1898...	Mare Island.....	--	1,400,000
1899...	San Jacinto.....	6	--
1906...	San Francisco.....	700	500,000,000
1915...	Imperial Valley.....	6	900,000
1918...	San Jacinto and Hemet.....	--	200,000
1925...	Santa Barbara.....	13	8,000,000
1933...	Long Beach.....	115	40,000,000
1940...	Imperial Valley.....	9	6,000,000
1941...	Santa Barbara.....	--	100,000
1941...	Torrance-Gardena.....	--	1,100,000
1949...	Terminal Island.....	--	9,000,000
1951...	Terminal Island.....	--	3,000,000
1952...	Kern County.....	14	60,000,000
1954...	Eureka-Arcata.....	1	2,000,000
1955...	Terminal Island.....	--	3,000,000
1955...	Oakland-Walnut Creek.....	1	1,000,000
1957...	San Francisco.....	--	1,000,000
1961...	Terminal Island.....	--	4,500,000
1969...	Santa Rosa.....	--	8,350,000
* 1971...	San Fernando.....	58	504,950,000
	Totals.....	1,020	\$1,155,825,000

* Compare to \$430,000,000 market value for all taxable improvements in Napa County, in 1974.

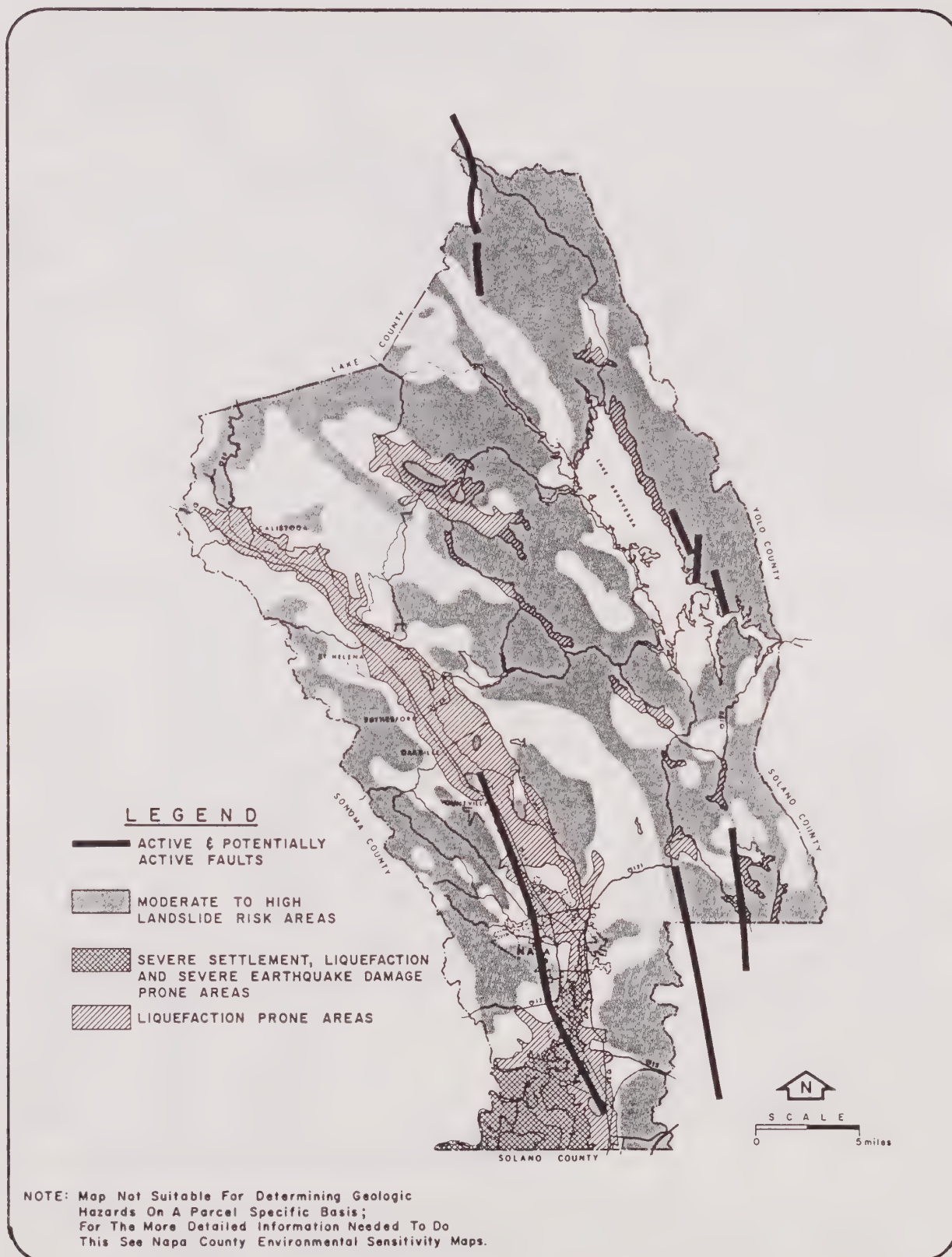
An enlightening report has recently been completed on the probable results of a major earthquake in the San Francisco Bay area (Algermissen et al., 1972). This study postulates earthquakes to magnitude 8.3 on the San Andreas and Hayward faults, with epicenters near the San Francisco and East Bay metropolitan areas, and at different times of day. It considers the probable effects and demands on medical resources including hospitals, supplies, laboratories, and ambulance services, as well as probable effects on public needs such as communications, transportation, utilities, schools, and mercantile areas. Deaths and injuries are estimated for various earthquake magnitudes at different times of the day.

	Magnitude	Time	Deaths*	Hospitalized injuries
San Andreas fault..	8.3	2:30 a.m.	2,850	10,800
		2:00 p.m.	9,640	34,400
		4:30 p.m.	10,360	40,360
	7	2:30 a.m.	500	1,900
		2:00 p.m.	1,640	6,200
		4:30 p.m.	1,990	11,680
Hayward fault.....	8.3	2:30 a.m.	25	100
		2:00 p.m.	80	320
		4:30 p.m.	100	390
	7	2:30 a.m.	3,120	11,600
		2:00 p.m.	7,200	28,500
		4:30 p.m.	6,650	24,900
	7	2:30 a.m.	1,040	3,860
		2:00 p.m.	3,200	9,900
		4:30 p.m.	2,240	8,160
	6	2:30 a.m.	330	1,220
		2:00 p.m.	730	2,600
		4:30 p.m.	700	2,550

* Deaths in the event of dam failure are not included.

Source: Calif. Div. of Mines and Geology, 1973

FIGURE 100: GEOLOGICALLY HAZARDOUS AREAS



Source: Compiled by Napa County Planning Department from Figures 85, 91, 94 and 95 of the Napa County Seismic Safety Element.

Conclusion

The State Guidelines for the Seismic Safety Element have suggested that the concept of "risk" be used as a guide for formulating plans, policies, and programs. Specifically, the Guidelines recommend that the Seismic Safety Element contain a general policy statement that "specifies the level or nature of acceptable risk to life and property."

To specify an acceptable risk level, it would be necessary to have a detailed evaluation of all natural seismic hazards, a detailed evaluation of all structural hazards and a fairly precise answer to the question, "How safe is safe enough?" In the last decade available mapping of geologic hazards and faults has greatly improved. The best maps currently available are incorporated into the "Environmental Sensitivity Maps" (maintained by the Conservation, Development, and Planning Department) and are at a scale of 1 inch=2000 feet. A more detailed evaluation of geologic hazard is often necessary for proper review of specific development proposals.

Since it is questionable whether Napa County could, at this time, define a level of "acceptable risk" which would be universally acceptable; a more workable approach would be to specify those conditions which present an "unacceptable risk." While the imperfections of existing geologic hazards maps and the difficulties of accurately predicting the results of future earthquakes are manifest, implementation of the following Seismic Safety Goals and Policies will minimize many of the more obvious hazards and thus provide a reasonable measure of protection to the lives and property of the citizens of Napa County.

4. SEISMIC SAFETY GOALS AND POLICIES

GOAL A: Use existing authority of local governments to reduce hazards to life and property.

Policies

1. Include when necessary a geologic/seismic evaluation as a part of required Environmental Impact Reports. (See Appendix B)
2. Require a geologic/seismic report (See Appendix B)
 - a. When warranted by the results of a geologic/seismic evaluation.
 - b. For new residential developments, roads or highways proposed to be located on parcels which contain identifiable landsliding or slumps; and
 - c. For all proposed structures and facilities open to the public and serving 100 persons or more.
3. Discourage the development of structures such as hospitals, police and fire stations, and buildings open to the public whose occupancy exceeds 100 persons from locating within 1/8 mile of an active fault or the placement of transportation or utility corridors in or accross such areas, excepting Oak Hill, unless a geologic/seismic report show such development or placement is consistent with public safety.
4. Promote the installation of strong-motion accelerographs where appropriate.
5. Encourage the completion of an inventory of existing structures such as schools, etc. and encourage strengthening where needed to improve public safety.
6. Identified active faults incorporated in the County's Seismic Safety Plan Element and the immediate adjacent areas, excepting Oat Hill, should be restricted to open space uses such as agriculture, parks, trails, or wildlife habitat.
7. Development proposals covered in policy 2 to be reviewed by the County Department of Public Works prior to issuance of a building permit.

8. Develop a program for on-site inspection of grading work for developments in questionable areas to insure that bedding planes are not undercut, that proper fill material is carefully placed and compacted.
9. Encourage planting of vegetation on unstable slopes to protect structures at lower elevations. Utilize native plants for landscaping in the hills, to eliminate the need for supplemental watering which can promote earth movement.
10. Study the development of safety standards for all land within areas subject to inundation downstream from water-retaining structures that might fail as a result of an earthquake.
11. Rezone open space lands subject to extreme geologic hazards and geologically sensitive lands to the :GR (Geological Risk) Combination District.

GOAL B: Promote intergovernmental cooperation directed towards lessening known hazards and defining uncertain hazards.

Policies

1. Encourage State and Federal governments to require lending institutions to require earthquake insurance on all residential structures as a condition to the granting of a loan on such properties. The insurance could be included with a broad-coverage natural disaster insurance program.
2. Encourage the purchase of National Flood Insurance, which also covers damage from mudflows.
3. Promote a joint program between all local governmental units in Napa County to employ such additional expertise as needed to provide technical information in regard to seismic hazards, to provide technical assistance, and, over time, to prepare detailed geologic hazard maps of the County for planning purposes.
4. Assess the potential hazard from the possible rupture or collapse of above-ground tanks holding large quantities of liquid; whether water, wine or petroleum products.
5. Promote land use, transportation, utility, and flood control policies that would discourage urban development in wetlands and drained wetlands in the Southern part of Napa County.

6. Review program proposed in the 1974 California Urban Geology Master Plan for their applicability to Napa County.
7. Develop a geologic mapping program in cooperation with U.S.G.S., California Division of Mines and Geology and other Federal, State and Regional agencies to identify geologic hazards; including fault zones (both active and inactive), landslides, and landslide-prone areas in Napa County.
8. Encourage the State and Federal governments to develop dam safety programs including the preparation of contingency plans for urbanized areas in the proximity of existing and future dams.
9. Encourage local governments to develop:
 - a. search and rescue programs,
 - b. emergency communication systems,
 - c. emergency services and facilities programs.
10. Encourage implementation of the following procedural recommendations (Joint California Legislative Committee on Seismic Safety, 1972).
 - a. Property Reports, State law (commencing with Section 38780 of the Government Code) now permits local jurisdictions to require sellers of property to obtain a residential property report from the city or county prior to the resale of residences. The purpose of the law is to make certain that purchasers are aware of local regulations and special restrictions pertaining to a residence and parcel prior to consummation of a sale. It is recommended that this local option should be exercised by the County. Local reports should include in addition to other information available city or county information with respect to geologic and seismic conditions.
 - b. Local Agency Formation Commission's charge from the State should be reviewed to make certain that adequate attention is given to seismic safety problems.

- c. Federal Grant and Loan Programs such as those of HUD that result in a significant amount of construction should be reviewed with respect to seismic safety as well as other geologic hazards.
- 11. Consider as a part of the County Zoning Ordinance the development of a geologic hazard combined zone.
- 12. Consider requiring dynamic analyses of design specifications and plans for proposed buildings.
- 13. Encourage research and development regarding seismic protection standards for inclusion in County Building Code.

GOAL C: Participate in public education programs.

Policies

- 1. Prepare written materials to inform the general public, developers and home builders of potential seismic problems in Napa County.
- 2. Encourage schools to teach first aid as a required subject, to prepare students for emergency/hazard situations.

5. APPENDIX

APPENDIX A: FELT REPORTS IN NAPA COUNTY

The following is a catalogue of earthquakes reportedly felt in Napa County from 1864-1969. This listing represents a compilation of data from a number of different sources.

1. Earthquakes in California, 1769-1928; Bulletin of the Seismological Society of America, V. 29, No. 1, P. 21-252.
2. United States Earthquakes, 1929-1969 (Separate volume for each year): U.S. Department of Commerce.
3. Earthquake History of the U.S., revised edition (through 1970): U.S. Department of Commerce.
4. Santa Rosa Earthquakes, Mineral Information Service, V. 23, No. 3 (March 1970): California Division of Mines and Geology.
5. Napa County, Earthquake to End of 1966, Computer printout: Seismographic Station, University of California, Berkeley.

Since the exact measurement of seismic activity has only been possible for the past several decades, the most common source of data is reports from eye-witnesses. These are often subject to error, especially when the observations are made under conditions of mental stress, surprise and fear. Eye-witness reports are difficult to appraise because of the differences in viewpoint of the observers and because the intensity of an earthquake may vary over short distances due to changes in the character of the geology.

In the early days much of California was sparsely settled, making it quite difficult to secure earthquake reports. Much of the felt information contained in the above listed sources has been garnered from newspapers. In some cases it is possible that no reports were received from the region of greatest intensity, and newspaper accounts often contain inaccuracies as to the date and time of earthquakes.

All of the earthquakes listed in the catalogue were checked against available Napa County newspapers. Unfortunately, for many dates newspapers were not available, either because they were not being published at the time or simply because copies of published newspapers have not been preserved. Where the felt report has been confirmed by an account in a Napa County newspaper, indications has been made with an asterisk (*).

Each earthquake listed in the catalogue was reported in at least one of the sources cited above. In some cases, the date and time are dubious or uncertain because of conflicting reports. Where the information is dubious or uncertain, note has been made.

The time of day is given in Pacific Standard Time.

"Locality" in the catalogue refers not to the epicenter, but to the source of the felt report(s) within Napa County.

Under "Comments," indications of magnitude and intensity (where available) and comments from eye-witnesses are given.

FIGURE 101: FELT REPORTS IN NAPA COUNTY, 1864-1969

<u>YEAR</u>	<u>DATE</u>	<u>TIME</u>	<u>LOCALITY</u>	<u>DESCRIPTION</u>
1864	May 20	03:57(?)	Napa	V. Five or six distinct vibrations, lasting 15 to 20 seconds; no damage, also Bay Area
1865	Mar 7	23:30	Napa	V. Heavy shock
	Mar 8	00:30	Napa	Aftershock
	Mar 8	06:00	Napa	V. Heavy shock
	Oct 27	01:00	Napa	
1868	May 9	23:30	Calistoga	
1871	Jun 21		Calistoga	Severe
	Oct 21		Calistoga	
1872	Sep 18		Yountville	Evening
1873	Jul 15		Napa	IV. Slight shock
1885	Feb 5	23:00	Calistoga	* Light shock, continued a few seconds, not severe
	Feb 6	02:00	Calistoga	* Lighter than earlier shock
	Oct 16	05:00	Napa	* IV. Two shocks, several seconds duration, vibrations west to east
1889	Sep 24	08:00	Napa	*
1890	Jan 18		Napa	Two slight shocks, vibrations north to south
1891	Oct 11	21:15(?)	Napa	* Foreshock
	Oct 11	22:28	Napa	* VIII.- Vibrations northwest to southwest, lasting 10-12 seconds, IX. About 20 aftershocks in following hours, considerable structural damage.
	Oct 14	04:30	Napa	* Quite a heavy shock, three lighter ones followed
1892	Mar 13	08:23	Napa	Slight shock of 8 seconds duration
	Mar 13	08:35	Napa	Rather severe vibrations north to south, 12 seconds
	Jul 26	02:10	Napa	A heavy shock, vibrations north to south
	Sep 27		Napa	
1893	Jul 21		Napa	I.
	Oct 19	16:20	Napa	
	Aug 9	09:15	Napa	VIII. In Sonoma County
1896	Aug 19		Napa	
1898	Mar 30	23:44	Napa/ St. Helena	* VII.- Heavy, northeast to southwest. Four or five smaller shocks in the following hours. Much structural damage, also Mare Island. Felt throughout Bay Area.
	Apr 7	00:30	Napa	* Light shock

(Continued)

FIGURE 101 (Continued)

1899	Jan 13	13:20	Napa	*	III. Quite a sharp shock
	Feb 10	10:10(?)	Calistoga	*	Quite a heavy shock; no damage. Vibrations north to south; no damage.
	Feb 13		Napa		Also Sonoma
	Nov 16	21:10	Napa		
	Dec 25		Napa		
1900	Jan 5		Napa		
	Mar 26	06:50	Napa	*	Also Vacaville and Vallejo
	Apr 16	13:45	Napa		Two shocks
	Nov 25	00:45	Napa		
1901	Oct 29	16:36	Napa	*	Sharp shock. Vibrations east to west (?), also throughout north Bay Area
1902	May 20	22:20	Napa	*	Short, heavy roll
	Sep 18	04:00 (?)	Napa	*	Sharp shock
1903	Apr 26	05:20	Napa		Also Berkeley
1904	Aug 2	09:50	Calistoga		III.
	Aug 2	09:57	Calistoga		
1905	Jun 18		Napa		
1906	Apr 18	05:15	Napa	*	Vibrations north to south, lasting 40 seconds. Significant structural damage. <u>San Francisco Earthquake</u> also Santa Rosa and San Jose?
	Apr 20	04:50	Napa		
	Apr 21	03:00	Napa		
	Apr 22	15:00	Napa		
	Apr 28	00:35	Napa		Sharp shock
	May 1		Napa		3 light shocks
	May 2	00:35	Napa		Sharp shock
	May 2	21:22	Calistoga		
	May 11	15:30(?)	Napa	*	
	May 12	04:00	Napa		
	May 13	19:50	Napa		
	May 31	05:45	Napa		
	Jun 11		Napa		
	Jun 15(?)		Napa		Also Peachland
	Jun 26		Napa		Also Peachland
	Aug 22	01:55	Napa		
	Dec 24	02:00	Napa		Sharp jar
1919	Jan 20	01:25	Napa/ St. Helena	*	V. Rapid rocking, duration five seconds, north to south
	Feb 25	22:39	Napa		IV. Also Vallejo
					VI. Origin probably in Glen Ellen region. Felt throughout North Bay.

(Continued)

FIGURE 101 (Continued)

1929	Sep 2	17:45	Calistoga/ St. Helena		
	Sep 8	10:45	Calistoga		Very slight
	Sep 14	21:30	St. Helena		Very slight
1931	Apr 3	23:45	Calistoga		Feeble
	Apr 6	00:07	Calistoga		Feeble
	May 29	02:43	Calistoga		
1932	Sep 22	12:50	Calistoga		Weak
	Sep 22	23:48	Calistoga/ St. Helena		.IV. .IV.
	Sep 23	03:45	Calistoga		Weak
1940	Jan 14		Carneros	*	Cracked plaster walls
1941?	Sep 17	21:48	St. Helena	IV.	Moderate size
1942	Oct 16	23:10	St. Helena/ Pope Valley		Felt by several; windows rattled and doors creaked
1948	Oct 12	16:23	St. Helena	V.	Light shock, shook trees and bushes strongly
1952	Sep 25	20:35	St. Helena/ Calistoga	*	IV. Buildings creaked, loose objects swayed, light fixtures rattled. (3.2)
1956	Apr 4	20:29	St. Helena/ Angwin	*	VI. (4.4) Two sharp shocks, minor structural damage (cracks) also Napa, Calistoga and North Bay.
	Apr 11	05:12	St. Helena	*	IV. (3.1) After shock of April 4 th quake
1958	Jan 31	23:08	Calistoga	*	IV. (3.4)
7	Apr 20?	21:6:58	Monticello Dam		(4.0) Epicenter 25 miles northeast of Santa Rosa
1959	Jun 29	23:58	St. Helena	IV.	(3.4) Epicenter at Mt. St. Helena. Windows and doors rattled, house creaked, rapid southeast to northwest motion.
	Dec 15	18:28	St. Helena/ Napa/ Calistoga	*	(4.1)
1962	Feb 28	05:40	Calistoga	*	IV. Maximum, also Kenwood, Santa Rosa
1969	May 8	14:10	Angwin	* I-III.	At Angwin

APPENDIX B: GEOLOGIC/SEISMIC REPORT GUIDELINES

The following guidelines are taken from "Geology and Earthquake Hazards: Planners Guide to the Seismic Safety Element" prepared by Grading Codes Advisory Board and Building Code Committee of the Southern California Section, Association of Engineering Geologists, July, 1973.

I. Introduction

This is a suggested guide or format for the seismic section of engineering geologic reports. These reports may be prepared for projects ranging in size from a single lot to a master plan for large acreage, in scope from a single family residence to large engineered structures, and from sites located on an active fault to sites a substantial distance from the nearest known active fault. Because of this wide variation, the order, format, and scope should be flexible and tailored to the seismic and geologic conditions and intended land use. The following suggested format is intended to be relatively complete, and not all items would be applicable to small projects or low risk sites. The list of items to be investigated may be abbreviated at the discretion of the Conservation, Development and Planning Commission. In addition, some items would be covered in separate reports by soil engineers, seismologists, or structural engineers.

II. The Investigation

A. Regional Review - A review of the seismic or earthquake history of the region should establish the relationship of the site to known faults and epicenters. This would be based primarily on review of existing maps and technical literature and would include:

1. Major earthquakes during historic time and epicenter locations and magnitudes, near the site.
2. Location of any major or regional fault traces affecting the site being investigated, and a discussion of the tectonic mechanics and other relationships of significance to the proposed construction.

B. Site Investigation - A review of the geologic conditions at or near the site that might indicate recent fault or seismic activity. The degree of

detail of the study should be compatible with the type of development and geologic complexity. The investigation should include the following:

- *1. Location and chronology of local faults and the amount and type of displacement estimated from historic records and stratigraphic relationships. Features normally related to activity such as sag ponds, alignment of springs, offset bedding, disrupted drainage systems, offset ridges, faceted spurs, dissected alluvial fans, scarps, alignment of landslides and vegetation patterns, to name a few, should be shown on the geologic map and discussed in the report.
- *2. Locations and chronology of other earthquake induced features caused by lurching, settlement, liquefaction, etc. Evidence of these features should be accomplished with the following:
 - a. Map showing location relative to proposed construction.
 - b. Description of the features as to length, width and depth of disturbed zone.
 - c. Estimation of the amount of disturbance relative to bedrock and surficial materials.
- 3. Distribution, depth, thickness and nature of the various inconsolidated earth materials, including ground water, which may affect the seismic response and damage potential at the site should be adequately described.

C. Methods of Site Investigation -

- *1. Surface investigations
 - a. Geologic mapping.
 - b. Study of aerial photographs.
 - c. Review of local ground water data such as water level fluctuation, ground water barriers or anomalies indicating possible faults.

* Items noted with an asterisk on pages 296-298 are to be included in a Geologic/Seismic Evaluation.

2. Subsurface investigation

- a. Trenching across any known active faults and suspicious zones to determine location and recency of movements, width of disturbance, physical condition of fault zone materials, type of displacement, and geometry.
- b. Exploratory borings to determine depth of unconsolidated materials and ground water, and to verify fault-plane geometry. In conjunction with the soil engineering studies obtain samples of soil and bedrock material for laboratory testing.
- c. Geophysical surveys which may indicate types of materials and their physical properties, ground water conditions, and fault displacements.

III. Conclusions and Recommendations

At the completion of the data accumulating phase of the study, all of the pertinent information is utilized in forming conclusions of potential hazard relative to the intended land use or development. Many of these conclusions will be revealed in conjunction with the soil engineering study.

*A. Surface Rupture Along Faults

1. Age, type of surface displacement, and amount of reasonable anticipated future displacement of any faults within or immediately adjacent to the site.
2. Definition of any areas of high risk.
3. Recommended building restrictions or use-limitations within any designated high risk area.

*B. Secondary Ground Effects

1. Estimated magnitude and distance of all relevant earthquakes.
2. Lurching and shallow ground rupture.
3. Liquefaction of sediments and soils.
4. Settlement of soils.

5. Potential for earthquake induced landslide.

IV. Presentation of Data

Visual aids are desirable in depicting the data and may include:

A. General data

1. Geologic map of regional and/or local faults.
2. Map(s) of earthquake epicenters.
3. Fault strain and/or creep map.

B. Local or site data

1. Geologic map.
2. Geologic cross-sections illustrating displacement and/or rupture.
3. Local fault pattern and mechanics relative to existing and proposed ground surface.
4. Geophysical survey data.
5. Logs of exploratory trenches and borings.

V. Other Essential Data

*A. Sources of data

1. Reference material listed in bibliography.
2. Maps and other source data referenced.
3. Compiled data, maps, plates included or referenced.

B. Vital support data

1. Maximum credible earthquake.
2. Maximum probable earthquake.
3. Maximum expected bedrock acceleration.

C. Signature and license number of geologist registered in California.

6/7/83

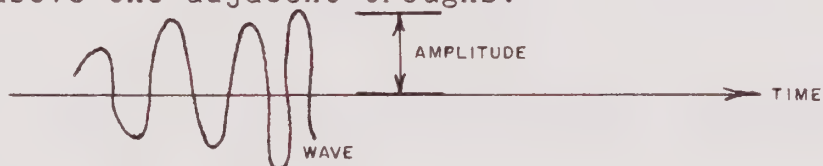
APPENDIX C: GLOSSARY (Various Sources)

Alluvial Fans are built by rivers flowing from mountains onto low cone-shaped heaps, steepest near the mouth of the valley, and sloping gently outward with ever decreasing slope.

Alluvium - A general term for the sediments laid down in river beds, flood plains, lakes, fans at the foot of the mountain slopes, and estuaries during relatively recent geologic times.

Amplification - The increase in earthquake ground motion that may occur to the principal components of seismic waves as they enter and pass through different earth materials.

Amplitude - One-half the elevation of the crest of a wave or ripple above the adjacent troughs:



Anticline - An upfold or arch of rock strata formed by internal earth pressure forming a shape like the roof of a house. Erosion could alter this shape leaving only the inclined strata.

Asymptotic Limit - Theoretical end-state which is being approached; but never reached.

Attitude (of rock structures) - A term including the terms dip and strike. The attitude of the flat surface of a sedimentary bed, whether inclined or not, is referred to the horizontal plane. Dip is its slope inclination (in degrees) from this plane, and is measured with a clinometer. Strike is the compass bearing on the line of intersection of its surface with horizontal plane. The terms may also apply to faults, veins, and dikes.

Basalt - A dark-colored, fine-grained volcanic rock, composed essentially of the mineral plagioclase feldspar and one or more dark minerals such as pyroxene.

Bed - The smallest division of a stratified series, and marked by a more or less well-defined plane from its neighbors above and below.

Bedrock - Any solid rock underlying soil, sand, clay, etc.

Breccia - A rock composed of angular coarse fragments, commonly cemented together.

Chert - A compact sedimentary rock containing abundant quartz of organic or precipitated origin.

Clastic rock or Clast - A rock which is composed principally of detritus transported mechanically into its place of deposition.

Cohesion, rock - The capacity of a rock to stick or adhere together. In effect the cohesion of soil or rock is that part of its shear strength which does not depend upon interparticle friction.

Colluvium - Soil deposited by soil creep, landslides and surface wash.

Compaction - Decrease in volume of sediments, as a result of compression of sediments deposited above them.

Competent beds - Those beds or strata which, because of massiveness or inherent strength, are able to lift not only their own weight but also overlying rock. Therefore, such rock material is especially able to withstand failure such as landsliding.

Conglomerate - A rock composed of larger fragments (such as pebbles or cobbles) set in a matrix of finer material (such as sand, silt, and/or clay).

Consolidated material - Soft or hard rock which requires some medium of loosening at the excavation site before it can be handled. The more loosening required (i.e., blasting as opposed to bulldozing) the more consolidated the material.

Damping - A resistance to vibration that causes a progressive reduction of motion with time or distance.

Differential Settlement - Loss of strength or the loss of water and sand through liquefaction often does not occur evenly over broad areas. Thus the ground settles different amounts in adjacent spots. Can be very destructive to buildings.

Dynamic Analysis - Engineering study of the performance of a structure or site under dynamic (moving) loading conditions.

Earth-flow - A low flow of earth lubricated with water. Earth-flows may be discriminated from earth-slumps by reason of their greater mobility.

Elastic limit - The maximum stress that a material can withstand without undergoing permanent deformation either by solid flow or by rupture.

Epicenter - The geographical location of the point on the surface of the earth that is vertically above the earthquake focus.

Fault - An earth fracture or zone of fracture along which the rocks on one side have been displaced in relation to those of the other.

Fault block - A body of rock bounded by one or more faults.

Fault creep - Very slow periodic or episodic movement along a fault trace unaccompanied by quakes.

Fault-scarp - The cliff formed by a fault. Most fault scarps have been modified by erosion since faulting.

Fault set - Two or more parallel faults within an area.

Fault slip or slippage - The relative displacement of formerly adjacent points on opposite sides of a fault. Also known as fault creep.

Fault system - Two or more fault sets formed at the same time.

Fault surface - The surface along which dislocation has taken place.

Fault trace - The intersection of a fault and the earth's surface as revealed by dislocation of fences, roads, by ridges and furrows in the ground, etc.

Fault zone - A fault instead of being a single clean fracture, may be a zone hundreds of thousands of feet wide; the fault zone consists of numerous interlacing small faults or a confused zone of gouge, breccia or other material.

Fault, active - Active faults are faults which show evidence of any or all of the following:

1. Topographic or physiographic expressions suggestive of geologically young fault movements (movement in Holocene Epoch, last 11,000 years).
2. Fault creep.
3. Records of surface rupture within or adjacent to the study area in historic time.

Fault, inactive - Identifiable faults which do not meet any of the criteria listed under active faults.

Faulting - The movement which produces relative displacement of adjacent rock masses along a fracture.

Fissure - An extensive crack, break, or fracture in the rocks.

Formation - A rock body or an assemblage of rocks which have some character in common; applied to a particular sequence of rocks formed during one epoch; a rock unit used in mapping.

Frequency - The number of seismic wave peaks which pass through a point in the ground in a unit of time. Usually measured in cycles per second.

Friable - A term applied to rocks that are easily crumbled or pulverized.

Fundamental Period - Time, in seconds, between peak oscillations of a structure; which is a function of size and design.

Graywacke - A hard, dark-colored, sandstone composed primarily of highly angular quartz and feldspar in a clay matrix. Usually contains significant quantities of rock fragments.

Ground cracking - Cracks usually occurring in stiff surface materials resulting from differential ground movement.

Ground failure - A situation in which the ground does not hold together such as in landsliding, mud flows, liquefaction and the like.

Ground lurching - Undulating waves in soft saturated ground that may or may not remain after the earthquake.

Ground strength - The limiting stress that ground can withstand without failing by rupture or continuous flow.

Hayward fault - A large and active branch of the San Andreas Fault System. It has been the center of many earthquakes, including the 1868 earthquake which was one of the largest ever to hit Northern California.

Hummocky - Lumpy land, or in small uneven knolls. This condition is a sign off previous extensive landsliding.

Intrusion - An igneous rock that has been injected into older rocks; it has cooled and solidified from a molten condition under the cover of the surrounding rock mass.

Inundation - Flooding caused by water topping a dam or water released by dam, reservoir, levee or other break.

Landsliding - The perceptible downward sliding or falling of a relatively dry mass of earth, rock, or mixture of the two. Often loosely used to also include sliding of wet earth masses such as mudslides and earthflows.

Liquefaction - A process by which a water saturated sand lens loses coherence when shaken. Involved is the collapse of sand grains into intergranular voids which induces an increase in pore pressure and loss of strength. This loss of strength leads to a quicksand condition in which objects can either sink or float depending on their density.

Melange - A mixture or complex of rocks.

Microseismic Event - An earthquake or man-induced vibrations observable only with instruments.

Microzonation - Preparation of maps precise enough to be used for land-use zoning.

Mudflow or mudslide - A flowage of heterogeneous debris lubricated with a large amount of water.

Natural Period - Time, in seconds, between peak accelerations that a site will experience as a result of seismic wave action on the particular conformation of underlying bedrock and soils.

Plastic Flow - Slow movement of material normally considered solid.

Residual soil - A soil deposit formed by the decay of rock in place.

Rupture - Shearing of the earth's surface.

Sag Ponds - Ponds occupying depressions along active faults. The depressions are due to uneven settling of the land.

Scarp - An escarpment, cliff, or steep slope of some extent along the margin of a plateau, terrace, bench, and at the top of a slide.

Sediment - Solid material settled from suspension in a liquid.

Sedimentary rocks - Rocks, commonly stratified, formed by the accumulation of sedimentation in water or from air.

Seiche - An oscillation of the water in a lake, bay, etc. caused by changes in atmospheric pressure, seismic disturbances, winds or waves, etc.

Seismograph - An instrument that writes a permanent continuous record of earth vibrations.

Seismic - Pertaining to an earthquake or earth vibration, including those that are artificially induced.

Seismology - The science of earthquakes and related phenomena.

Seismometer - A device which detects vibrations of the earth, and whose physical constants are known sufficiently for calibration to permit calculation of actual ground motion from the seismograph.

Shear - A mode of failure whereby two adjacent parts of a solid, slide past one another parallel to the plane of contact. To subject a body to shear, similar to the displacement of the cards in a pack relative to one another.

Slump - The downward slipping of a mass of rock or unconsolidated material, moving as a unit or as several subsidiary units, usually with a backward rotation.

Strata - Layers of sedimentary rocks.

Strike-slip - Fault displacement parallel to the strike of the fault. See "attitude" and "slip."

Strong motion - Ground motion produced by a "strong" earthquake or one capable of producing damage to structures. The magnitude of such an earthquake may vary considerably according to the character of the earthquake.

Subsidence - The process of settling of alluvial deposits, usually observed as a lowering of the ground surface.

Surface wash - A loose surface deposit of sand, gravel, boulders, etc.

Suspected Fault - Faults identified or inferred but neither mapped precisely nor encompassed by an Alquist-Priolo Special Studies Zone.

Syncline - A trough-shaped fold in rocks in which the strata dip inward from both sides toward the axis. The opposite of anticline.

Topography - The physical features of the land, especially its relief and contour.

Torsional forces - Forces which act to twist the object in question.

Tsunami - A sea wave produced by large aerial displacements of the ocean bottom, often the result of earthquakes or volcanic activity. Also known as seismic sea waves.

Water Table - The upper surface of a zone of water saturation within the ground.

APPENDIX D: BIBLIOGRAPHY

- Allen, C. R., 1968, "The tectonic environments of seismically active and inactive areas along the San Andreas fault system" Stanford Univ. Pubs. Geol. Sci., v. 11, p. 70-80.
- Algermissen, S. T., et. al., 1972, "A Study of Earthquake losses in the San Francisco Bay Area," a report prepared for the Office of Emergency Preparedness.
- American Society of Planning Officials, 1973, PAS Memo No. M-12, "Guidelines for Developing a Seismic Safety Element for the General Plan," A.S.P.O., Chicago, p. 7.
- Association of Engineering Geologists, July 1973, "Geology and Earthquake Hazards: Planners Guide to the Seismic Safety Element."
- Atomic Energy Commission, 1971, "Nuclear Power Plants, Seismic and Geologic Siting Criteria," Federal Register, v. 36, No. 228, p. 22601-22605.
- California Department of Water Resources, 1961, Bulletin 99, "Recon. Report on Upper Putah Creek Basin," p. 253.
- California Department of Water Resources, 1971, Bulletin 17-71, "Dams Within the Jurisdiction of the State of California."
- California Division of Mines and Geology, 1949, Bulletin 142, "The Counties of California."
- California Division of Mines and Geology, 1963, Santa Rosa Sheet of the Geology Map of California, Sacramento, p. 1.
- California Division of Mines and Geology, March 1970, Mineral Information Service, Santa Rosa Earthquakes of October, 1969.
- California Division of Mines and Geology, November, 1971, California Geology, "When the Earth Quakes," Sacramento, p. 203-223.
- California Division of Mines and Geology, 1972, CDMG Notes, "How Earthquakes are Measured."
- California Division of Mines and Geology, 1973, "Urban Geology Master Plan," Sacramento, p. 112.
- California Division of Mines and Geology, June 1974, California Geology, p. 136.

California Division of Mines and Geology, January 1983, "State of California Special Studies Zones - Preliminary Review Maps," Sacramento, Jericho Valley, Knoxville, Cuttings Wharf, Cordelia and Mt. George Quandrangles.

Cassayre, P., Correspondence and discussions, 1974.

Dwyer, Noguchi and O'Rouche, 1976, "Reconnaissance Photointerpretation Map of Landslides in 24 Selected 7.5 Minute Quandrangles in Lake, Napa, Solano and Sonoma Counties, California," Open File Map 76-74, U.S. Geological Survey, Menlo Park.

Fox, K., Correspondence and discussions, 1974.

Freeman, J., Earthquake Damage and Earthquake Insurance, McGraw Hill, New York, 1932.

"Geologic Hazards and Public Problems," Conference Proceedings, Santa Rosa, May 27-28, 1969.

Goldman, H., "Geology of San Francisco Bay" in California Division of Mines and Geology Special Report 97, 1969.

Governor's Earthquake Council, 1972, "First Report," Sacramento, p. 64.

Hansen, F. K., Correspondence and discussions, 1974.

Helley and Herd, 1977, "Maps Showing Faults with Quaternary Displacement, Northeastern San Francisco Bay Region, California," Miscellaneous Field Studies Map MF 881, U.S. Geological Survey, San Francisco.

Highway Research Board, 1958, Landslides and Engineering Practice, p. 224.

Housner, G. W., 1970 "Design Spectrum," in Weigel, R. D., Earthquake Engineering: Prentice-Hall, Inc., Englewood Cliffs, N.J. 518 p.

Huffman, 1972, Preliminary Report 16, "Geology for Planning on the Sonoma County Coast Between the Russian and Gualala Rivers," division of Mines and Geology, Sacramento, p. 38.

International Conference of Building Officials, Uniform Building Code, Pasadena, 1973.

Joint Committee on Seismic Safety, 1972, "The San Fernando Earthquake of February 6, 1971 and Public Policy," California Legislature, Sacramento.

Laird, R., Discussions, 1974.

Lee, C. H., and Praszker, M., "Bay Mud Developments and Related Structural Foundations," in Calif. Div. of Mines and Geology Special Report 97, 1969.

Meade, B. K. and Small, J. B., 1966, "Current and recent movement on the San Andreas Fault," California Division of Mines and Geology Bull. 190, p. 385-391.

Menci, V. & Guido, 2., 1967, Landslides and Their Control, Elsevier, New York, p. 202.

Miller, R. W., 1970, "Results of surveys for study of earth movement 1876, 1906 and 1969 - vicinity of Fort Ross, California," Coast and Geodetic Survey office report, p. 19.

Moore, W. G., 1958, Dictionary of Geography, Penguins Books, Baltimore, p. 191.

Napa County Conservation, Development and Planning Department, 1983, "Napa County Environmental Sensitivity Maps," Napa, March 2, 1983.

"Proceedings of the Conference on Soil Stabilization," Massachusetts Institute of Technology, 1952.

Richter, C. F., 1958, Elementary seismology, W. H. Freeman and Company, San Francisco and London, 1958.

Seed, H., "Seismic Problems in the Use of Fills in San Francisco Bay," in California Division of Mines and Geology Special Report 97, 1969.

Sharpe, C. F. S., Landslides and Related Phenomena, Cooper Square, New York, 1968, p. 137.

Soil Conservation Service, "Report and General Soil Map, Napa, California," 1966, p. 60.

Steinbrugge, K., "Seismic Risk to Buildings and Structures on Filled Lands in San Francisco Bay," in California Division of Mines and Geology Special Report 97, 1969.

Steinbrugge, K., San Fernando Earthquake, Pacific Fire Bureau, San Francisco, 1971.

Town and Country Planning Branch, Ministry of Works, 1965, "Town planning and earthquake faults," Ministry of Works, Bull. No. 7, p. 1-6, Wellington, New Zealand.

- Tri-Cities Seismic Safety Committee, "Tri-Cities Seismic Safety Study," El Cerrito, Richmond, San Pablo, 1973, p. 199.
- U. C. Seismographic Station, September 3, 1969, Computer Print-out of Epicenters 1864-1966, Napa County.
- U. S. G. S., 1970, A. G. A. B. Bay Region Study, Basic Data Contribution #7: "Faults That are Historically Active or Show Evidence of Geologically Young Surface Displacement."
- U. S. G. S., 1971, Basic Data Contribution #9: "Preliminary Map of Historic Margins of Marshland."
- U. S. G. S., 1971, Basic Data Contribution #11: "Estimated Relative Abundance of Landslides."
- U. S. G. S., 1971, Basic Data Contribution #15: "Flood Prone Areas in the Napa River Drainage Basin, Napa County, California."
- U. S. G. S., 1971, Basic Data Contribution #32: "Precipitation Depth - Duration Frequency Relations - Isohyetal Map."
- U. S. G. S., 1972, Basic Data Contribution #37: "Map showing distribution and cost by Counties of Structurally Damaging Landslides in the Winter of 1968-1969."
- U. S. G. S., 1972, Basic Data Contribution #52: "Map Showing Areas of Potential Inundation by Tsunamis."
- U. S. G. S., 1972, Basic Data Contribution #54: "Preliminary Geological Map of Solano County and parts of Napa County."
- U. S. G. S., 1973, Basic Data Contribution #56: "Preliminary Geological Map of Eastern Sonoma County and Western Napa County."
- U. S. G. S., 1973, "Water Investigations 13-73 Ground-Water Hydrology of Northern Napa Valley," p. 64.
- U. S. G. S., 1974, Basic Data Contribution #67: "Preliminary Photointerpretation Map of Landslide...Deposits...of Napa County..."
- U. S. G. S., 1974, Circular 690, "Seismic Hazards and Land Use Planning," p. 33.
- Wallace, R. E., 1968a, Notes on stream channels offset by the San Andreas Fault, southern Coast Ranges, California, in Dickinson, W. R., and Grantz, Arthur, eds., Proceedings of conference on geologic problems of San Andreas fault system: Stanford University Pubs. Geol. Sci., v. 11, p. 6021. 1968b Minimizing earthquake hazards: Am. Inst. of Architects Jour., v. 19 no. 1, p. 65-69.

Wallace, R. E., 1970, "Earthquake recurrence intervals of the San Andreas Fault," Geol. Soc. American Bull., v. 81, p. 2875-2890.

Weaver, C. E., 1949, "Geology of Coast Ranges Immediately North of San Francisco Bay Region, California," Geolo. Soc. America Mem. 35.

SAFETY



GENERAL PLAN

SAFETY ELEMENT
TABLE OF CONTENTS

	<u>PAGE</u>
1. Introduction	311
2. Goals	315
3. Findings and Policies	316
a. Fire Hazards	316
b. Geologic Hazards	326
c. Flood Hazards	330
d. Transportation Hazards	339
e. Emergency Water Supplies	345
f. Disaster Preparedness	357
4. Appendix	373

FIGURES

102. Fire Hazard Severity Scale	318
103. Wildland Fire Hazard Map	319
104. Fire Hazard Areas	320
105. Floodplains and Watersheds	332
106. Inundation Maps for Napa County	334
107. Inundation Maps for Rector Creek Dam	335
108. Potential Highway Blockages Due to Reactivated Landslides	341
109. Evacuation Routes	344
110. Major Water Reservoirs in Napa Valley	346
111. "Small" Water Agencies in Napa County	347
112. "Large" Water Agencies in Napa County	348
113. American Canyon County Water District Water Distribution System	349
114. Friesen Angwin Water Company Water Distribution System	350
115. Pacific Union College Water Distribution System .	351
116. Emergency Organization Chart	358

1. INTRODUCTION

Disaster protection is a public service all too often taken for granted. Nearly everyone assumes that when a fire, flood, earthquake or other disaster occurs enough firemen and equipment will be on the scene. However, in some parts of California there have occasionally been insufficient personnel, inadequate equipment, lack of useable evacuation routes and disaster response planning to cope with disasters such as large wildland fires, landslides, floods and earthquakes.

Because of these problems the State Legislature requires that every city and county adopt a Safety Element for their general plans which will have the effect of requiring cities and counties to take disaster relief programs for geologic, earthquakes, fire, and other hazards into account in their planning programs. The enabling legislation is in Government Code Section 65302(i) which requires a safety element for all city and county general plans, as follows:

A safety element for the protection of the community from fires and geologic hazards including features necessary for such protection as evacuation routes, peak load water supply requirements, minimum road widths, clearances around structures, and geologic hazard mapping in areas of known geologic hazards.

A safety element aims at reducing death, injuries, damage to property, and the economic and social dislocation resulting from fire, geologic hazards, and other public safety hazards. While the requirements of the safety element focus primarily on fires in wildland areas adjacent to urban development and on geologic hazards, it also addresses other locally relevant safety issues such as urban structural fires and hazardous materials.

This safety element stresses planning and preparedness with the objective of reducing future costs associated with disasters such as wildland fires, earthquakes, land slides, flooding, blockage of evacuation routes and lack of emergency water supply. The issues addressed, particularly geologic, fire and flood hazards, are public health and safety issues already a part of the Land Use Element which the Safety Element supports and expands in content.

The concept of public safety as expressed in this element, and the proposed policies and programs to achieve a suitable degree of public protection, are based on the following assumptions:

1. Hazards are an unavoidable aspect of life. Not all hazards can be eliminated, nor can every degree of risk be eliminated for any specific hazard.
2. Public policy and action are appropriate to mitigate against hazards which: a) have a high degree of risk to the general public or to a large part of the population; or b) have a relatively low risk of occurrence but which would be considered disasters should the event occur; or c) are not considered to have a disaster potential but which are persistent safety problems with a history of occurring in Napa County.
3. Through the dissemination of information and public discussion satisfactory judgments can be made as to the levels of monetary, environmental and social costs appropriate to mitigate hazards to public safety.

The policies of this element are not intended to remove all risks associated with each specific type of hazard, but when implemented will reduce risks to life and property from certain natural and man-made events, and will lead to greater life safety in case of general disaster.

The determination of acceptable and unacceptable risk requires judgments based on weighing several factors including the nature of the hazard, the frequency, or risk, of a damaging event associated with the hazard, and the relative number of persons exposed to the risk. The degree or intensity of any specific hazard is a major consideration in public mitigation efforts. Thus, hazards with a high life-loss potential are less acceptable than hazards which primarily affect property, and hazards which could impact entire communities are less acceptable than hazards which may impact relatively few persons. For hazards to disaster "lifelines" (including water supply, emergency services, evacuation routes, and medical and mass care facilities) only a very low degree of risk is considered acceptable since these facilities and functions are critical to disaster recovery for entire communities.

Exposure to the natural hazards considered in this Element may or may not be taken voluntarily. Persons who choose to purchase property on unstable ground or subject to wildfires or flooding may or may not be aware of the potential

hazard. Some who may be aware do not care; others are just willing to take higher risk. Involuntary or unrecognized risks, such as exposure to hazardous substances on the other hand, are taken unknowingly. Voluntarily taken risks are not necessarily acceptable from the public point of view because property owners have expectations that grading and building regulations, fire services, and flood control works will provide a significant degree of risk reduction. The greater capital cost of public facilities in hazardous areas, plus higher maintenance costs, represents a disproportionate share of public tax dollars for hazard mitigation. Thus, interest in the conservation or development of areas subject to natural hazards and alternative means of providing for public safety is needed to avoid excessive risk and to prevent the voluntary risk-taker from increasing risk or cost to the involuntary risk-taker.

For the hazards discussed in the Element specific degrees of risk have been determined to be unacceptable and mitigation measures have been established through standards, permit procedures or regulations. These programs are the responsibility of many agencies, ranging from local fire districts to the federal government. The following list of programs and regulatory agencies is representative of the range of hazard mitigation efforts now undertaken at several government levels:

Flood control project standards vary by agency. Standards are set by the U.S. Army Corps of Engineers, the Federal Insurance Administration, State Department of Water Resources, and the County Flood Control District.

Fire prevention, detection and extinguishment requirements are set by the Uniform Building Code and Fire Code, and enforced by the Napa County Building Inspection Division and the California Department of Forestry. Road widths for fire fighting equipment are established and enforced by the Department of Forestry and the Public Works Department.

Vegetation clearance standards are enforced by the Department of Forestry.

Minimum grading standards and approval of grading projects are the responsibility of the County Public Works Department.

Emergency water supply requirements for fire fighting are based on Department of Forestry

standards and are implemented by the several water districts and water service areas.

Well and septic disposal system permits and small water systems licenses are granted by the County Department of Health, Environmental Health Division.

Larger dams are regulated by the State Division of Safety of Dams.

Evacuation routes and provisions for the passage of emergency vehicles in a disaster are a factor in disaster planning by the incorporated cities and the County through the coordination of the County Office of Emergency Services.

Even if not explicitly stated, there is an underlying assumption in these programs that the remaining risk is acceptable. It is a purpose of this Element to examine and evaluate the effectiveness of programs and regulatory processes to determine whether or not the residual risk is indeed acceptable. Policies for new or changed programs and actions indicate areas in which improvements are perceived as needed to achieve an acceptable level of risk.

Recommendations for the incorporation of public safety considerations into County planning functions have been assigned a high priority because this is the primary purpose of the State mandated Element. Recommendations for actions by other agencies, within and without County government, are equally essential to public safety in the County. Of these, actions which would mitigate hazards to life or impediments to disaster recovery should be considered to have a higher priority than actions which would primarily affect the safety of property.

2. GOALS

- GOAL A: Combine safety considerations into the planning process in order to reduce the loss of life, injuries, damage to property and economic and social dislocation resulting from fire, flood, geologic and other hazards.
- GOAL B: Promote intergovernmental cooperation directed towards lessening known hazards and defining uncertain hazards over the next 5 to 10 years.
- GOAL C: Participate in local, regional and state education programs regarding fire, flood and geologic hazards.
- GOAL D: Provide intergovernmental cooperation directed towards providing for a continuing high level of public services and coordination of services during a disaster.

3. FINDINGS AND POLICIES

FIRE HAZARD

In Napa County there are two aspects of fire safety: wildland fires and structural fires. In terms of fire hazards, land use relationships and mitigation measures, there are differences between wildland fires and structural fires. Common to both, however, are the concepts of fire hazard and fire risk. Fire hazards are those elements in the combustion process that actually burn or that cause a fire to burn faster or hotter than normal. Fire risks are those factors that cause fires to be ignited.

Findings

A. Wildland Fires

Napa County, along with the entire State of California, has a wildland fire potential that is found nowhere else on earth. The combination of highly flammable vegetation (fuel), long and dry summers (weather), rugged topography (steep slopes) and people who live, work and recreate in the wildlands adds up to a situation that results in wild fire risk and hazards of major proportions. Protection of the nearly 400,000 acres of rangeland, forest and watershed lands in Napa County is important for timber, recreation, wildlife, watershed, flood control and erosion prevention reasons.

The California Department of Forestry (CDF) has developed a Fire Hazard Severity Scale which utilizes three criteria in order to evaluate and designate potential fire hazard areas in wildland areas. The criteria are fuel loading (vegetation), fire weather (winds, temperatures, humidities and fuel moisture contents) and topography (degree of slope).

Some types of vegetation, such as chaparral, are more flammable than other types, and all vegetation is more flammable at certain times than at others.

With its Mediterranean climate, Napa County experiences a long, dry summer from May to November during which winds, temperatures, humidities and fuel moisture contents maintain high hazard levels. Of these four factors, wind is the most critical factor. Steep slopes in Napa County contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult.

Using these three criteria the Fire Hazard Severity Scale shown in Figure 102 has been used by CDF to map areas of fire hazard in Napa County. A generalized map of Napa County (Figure 103) indicates relative fire hazard areas. A sample of one of the CDF maps is shown on Figure 104. Some 350,000 acres are included in one of three classifications.

Fire risks in wildland areas are nearly all man-caused (90%). The remaining 10 percent is lightning caused. The most serious man-caused fires are started by arson, equipment use and smoking.

In June, 1981, the fire hazard characteristics of fire weather and fuel loading in Napa County had reached extreme hazard levels. On June 22nd the temperature reached 103 degrees F by early afternoon, the wind was blowing from the north at 18 mph and humidity was less than 4 percent. This occurred in a year characterized by heavy rains from January through March, no measurable rainfall from March 29th, higher than normal spring temperatures and low humidities.

During a seven hour period that June 22nd a series of 7 arson-set fires burned together creating a fire front 7 miles across, moving about 4,500 feet per hour. In 7 hours the Atlas Peak Fire consumed 23,000 acres of brush, grass and timber and destroyed 61 homes, 91 other buildings, 40 vehicles and numerous wildlife and domestic animals. An additional 23 dwellings and 39 outbuildings were damaged. No lives were lost, no major injuries were sustained and over 90 homes and 90 other buildings within the fire perimeter were saved.

The response to the Atlas Peak Fire involved 169 pieces of fire apparatus, 14 aerial tankers, 6 helicopters, 4 spotter planes, 21 bulldozers, 34 handcrews (over 3,100 personnel) converging on the scene to suppress the "fastest moving, most dangerous wildfire to strike Northern California in the month of June in the past 53 years."

The fire caused an estimated 36 million dollars in damage, cost over 1 million dollars to suppress and required the largest collection of personnel and equipment ever assembled in Napa County to battle a wildland blaze.

B. Structural Fires

In Napa County nearly 12,000 residential structures are located in the unincorporated area. Nearly 10,000 of these are single-family, 1,000 are mobile homes and the remainder are multi-family. Most of these residential structures are dispersed throughout the County with urban-type concentrations

FIGURE 102: FIRE HAZARD SEVERITY SCALE ①

CRITICAL FIRE WEATHER FREQUENCY →	I (1)			II (2)			III (8)		
FUEL LOADING ↓	SLOPE %			SLOPE %			SLOPE %		
	0-40 (1)	41-60 (1.6)	61+ (2.0)	0-40 (1)	41-60 (1.6)	61+ (2.0)	0-40 (1)	41-60 (1.6)	61+ (2.0)
Light (Grass) (1)	1	1.6	2	2	3.2	4	8	12.8	16
Medium (Scrub) (8)	8	12.8	16	16	25.6	32	64	102.4	128
Heavy (Woods-Brushwood) (16)	16	25.6	32	32	51.2	64	128	204.8	256
<div>1-12.8 MODERATE HAZARD</div> <div>16-32 HIGH HAZARD</div> <div>128-256 EXTREME HAZARD</div>									
Severity Factor Values are shown in Parentheses in the Table									

found in American Canyon, Silverado Country Club, Angwin, Deer Park, and Lake Berryessa. In addition to residential structures, there are many agricultural, commercial and industrial structures in the County. Some special purpose uses such as Pacific Union College, St. Helena Hospital and Napa County Airport include clusters of structures.

Particular types of structures have higher fire hazards than others. Structures built before the existence of the County Building Department and without conformance to electrical or building codes can be considered potentially hazardous. Structures with human occupancy are more hazardous for life-loss. Of residential structures, mobile homes have been considered by the National Commission on Fire Prevention and Control to be the fastest burning. Since 1972 standards for mobile homes have improved, but those built before 1972 and located in Napa County can be considered a higher hazard.

Mobile homes have insulated metal roofs which tend to retard roof fires. The greatest hazard is the danger of fire igniting the floor from underneath the home unless metal skirting from floor-line to ground-line is attached completely around the home except for proper venting. Due to (a) the flash nature of interior fires, (b) highly toxic smoke and gasses from plastics, and (c) inadequate exiting of many older mobile homes, the fatality rate for mobile homes has been several times greater than conventional homes per 100,000 fires.

① CDF hazard scale of moderate, high and extreme has been changed by CDPD to low, medium and high on Figures 103 and 104.

THIS MAP IS INTENDED TO PROVIDE A GENERALIZED PICTURE OF WILDLAND FIRE HAZARDS; FOR MORE DETAILED (PARCEL SPECIFIC) INFORMATION, THE NAPA COUNTY ENVIRONMENTAL SENSITIVITY MAPS SHOULD BE CONSULTED.

FIRE HAZARD

- HIGH
- MEDIUM
- LOW

0 8 MILES

6/7/83

FIGURE 104: FIRE HAZARD AREAS



Source: California Department of Forestry; Conservation, Development and Planning Department (NAPA COUNTY ENVIRONMENTAL SENSITIVITY MAP DESIGNATING FIRE HAZARD ON THE MT. GEORGE QUADRANGLE)

Fire Protection Services

The Napa County Fire Department (NCFD) provides wildland and structural fire protection services to the unincorporated areas of Napa County through volunteer fire departments and contractual agreement with the California Department of Forestry (CDF). Some 45,000 residents and thousands of annual tourists and recreationalists are protected along with nearly 400,000 acres of land. The NCFD consists of 7 fire stations staffed by 44 State-funded and 18 County-funded full-time employees. Also there are 210 volunteer fire fighters operating from 9 volunteer fire company stations. The State cost to operate the Lake/Napa County CDF fire system is about \$3 million annually. Napa County pays an additional \$1 million annually for its local area share. The total cost for fire protection in the unincorporated part of Napa County is about \$2 to \$2.5 million per year.

In 1981 the NCFD responded to 1,737 incidents, 161 percent increase from 1976. Of these 1,737 responses, nearly half or 836 were medical aid/rescue; 212 were wildland fires and 74 were structure fires. Over 40,000 man hours were expended on emergency operations.

Fire Hazards and Mitigation Measures

A. Wildland Fires

There are three general solutions to wildland fire hazards: affecting the causes; modifying the hazard and modifying the loss potential. As noted above, the two main causes of wildland fires are man (90%) and lightning (10%), with arson being the single most prevalent cause. The NCFD, CDF and volunteers share the responsibility of increasing public awareness of wildland fire problems and the need to spot and report suspected arson activities. The Napa County Arson Task Force has been formed to increase awareness, and the Napa Chamber of Commerce Arson Reward Fund has been established.

Modifying the hazard in terms of affecting the three criteria used to identify wildland fire potential (fuel load, fire weather and slope) is more practical with respect to fuel load. Two methods of fuels management are fuelbreaks and prescribed burning. Fuelbreaks are wide strips of land cleared or converted to less hazardous types of vegetation. Main ridges or side ridges are generally selected for fuelbreaks.

Prescribed burning is the planned application and confinement of a fire to a preselected land area in order to break up large wildland areas. Approximately 10 percent of Napa County's wildland areas (about 40,000 acres) would need

to be burned each year on a rotating basis to be effective. SB1704 provides state funding from the Environmental Resource Fund for up to 90 percent of the cost of prescribed burning and the cost of liability insurance. Another program, the California Forest Improvement Program (CFIP) provides up to 90 percent State funding for management planning, reforestation, timber stand improvement, wildlife habitat improvement and other forest conservation measures on private forest land. In some areas cattle and goats have been used to reduce fire fuel by planned grazing.

Although there is a need, currently there is no Countywide fuel break system. Some areas such as Dry Creek/Lokoya and numerous ranchers have a system of private fire trails. Considerable manpower and equipment would be required to construct fuel breaks or fire trails which could be supplied by the location of a Conservation Camp in Napa County. A number of prescribed burns are planned in Napa County but funding is limited and uncertain for future years. The CFIP is primarily forest oriented.

Decreasing the loss potential requires increasing the people and equipment with which to fight fires. No one local fire fighting agency can afford to keep all the manpower and equipment on hand at all times. Consequently, a system of mutual aid has been developed to quickly augment local forces as needed.

B. Structural Fires

Structural fires in a predominantly wildland area such as unincorporated Napa County can be considered from two points of view: external and internal caused. External caused structural fires relate to wildland fires where fire brands from other structures or vegetation ignite a structure, particularly the roof. Internal caused structural fires are the result of smoking, faulty electrical wiring or other interior dangerous situations.

Externally caused structure fire hazards can be reduced by adopting standards for spacing of structures, access, water supply, building design and materials and clearance of flammable native vegetation around structures.

Internally caused structure fire hazards can be reduced by public education, inspection of existing structures to identify dangerous conditions and correction of dangerous conditions.

Fire Hazards and Planning Policies

A. Wildland Fires

A basic planning and land use approach to wildland fire reduction in Napa County would be the incorporation of the

Fire Hazard Severity Scale into planning policies and standards. Standards for density, spacing, setback, access, water supply, building design and construction and vegetation clearance can be specifically geared to the three fire hazard severity classes. The standards can be clearly spelled out and applied on a consistent basis by joint review of the NCFD/CDF and planning staffs.

B. Structural Fires

As noted above, structural standards such as building design standards (roofing, vents, glass, siding and overhangs), can be integrated with the Fire Hazard Severity Scale and applied through the Uniform Building Code and adoption of the Uniform Fire Code. Although priority should be given to life-loss structural hazards (primarily residential occupancy), standards should also apply to industrial, commercial and public use structures. Enforcement, however, is more a Building Division and NCFD/CDF function than planning.

Policies for Fire Hazard Protection

A. Reduce Wildland Fires

1. Adopt standards to restrict urban development in high wildland fire hazard areas as identified by the Fire Hazard Severity Scale.
2. Develop a prescribed-fuel management program (including prescribed burns) for managing fire hazardous areas; to reduce wildfire hazard, improve watershed capabilities, promote wildlife habitat diversification and improve grazing.
3. Adopt regulations for clearance around structures, minimum road widths, evacuation routes and maximum road grades. (See Appendix C)
4. Develop stringent site criteria and construction standards for construction in high fire hazard areas and prohibit construction where these criteria are not met. (See Appendix C)
5. Develop a county-wide fuelbreak program to separate wildland fire hazard areas, provide access for fire suppression equipment and improve safety of firefighters.
6. Support a cooperative program to be started between the insurance providers and all agencies involved with the wildfire problem, whereby financial incentives can be gained by homeowners

and developers through either tax rebates or reduced insurance costs.

7. Support the State requiring property owners to comply with recommended fire safe standards before any low cost emergency loans are approved to rebuild in hazardous wildfire areas.
8. Recommend changes in existing law to require the Real Estate commission to notify the proper parties in all real estate transactions of the inherent dangers when moving into a hazardous fire area as part of the full disclosure notification.
9. Support the location of a State Conservation Camp in Napa County and the use of local jail inmates to provide people for fuel breaks and fire suppression.
10. Work with local agencies and 4H to develop a program of fire reduction by animal grazing on a rotating/loan basis.
11. Rezone open space lands subject to high fire risk to the :FR (Fire Risk) Combination District.

B. Reduce Structural Fires

1. Amend the Uniform Building Code to regulate the design and construction of buildings in those high fire hazard areas designated by fire officials in Appendix B in accordance with "Fire Safe" standards.
2. Adopt the Uniform Fire Code to establish Fire Protection standards.
3. Require all new development and existing development to comply with established fire safety standards. (See Appendix C)
4. Direct the County Counsel, in cooperation with the Conservation, Development and Planning Department and County Engineer to investigate the feasibility of mandatory occupancy reductions for identified fire hazardous buildings.
5. Study feasibility of requiring mandatory fire inspections of residences at time of sale.
6. Advocate and support efforts by Board resolution for Federal review of Internal Revenue Service regulations to limit utilization of accelerated depreciation schedules, as they apply to substandard buildings.

7. Advocate legislation providing for tax incentives on building improvements to encourage the repair or demolition of fire hazardous buildings.
8. Adopt a County ordinance requiring the preparation of disaster response plans for buildings over 3 stories or 30 feet tall, indoor public assembly facilities, and facilities housing dependent populations to include:
 - (a) Response plans prepared by building management personnel and submitted to county building officials and emergency response agencies for review.
 - (b) Building security personnel trained in disaster response functions designed to support the efforts of police and fire agencies.
9. Direct County fire officials to expand fire education programs.
10. Advocate by Board resolution revisions in the State Penal Code to impose criminal liability on property owners for fires resulting from identified and uncorrected fire hazards.

C. Research New Ways of Reducing Fire Losses

1. Encourage continued research in the field of fire safety.
2. Strengthen existing codes and ordinances pertaining to fire hazards.
3. Develop and support the use of new technology in the suppression and prevention of fires.

GEOLOGIC HAZARDS

Findings

This chapter of the Safety Element is directly related to the Seismic Safety Element of the General Plan which details several geologic hazards. The following hazards are summarized in this chapter:

- Fault Displacement
- Ground Shaking
- Ground Failure
 - landslide
 - liquefaction
 - subsidence
- Flooding
 - Tsunamis
 - Seiches
- Dam and Levee Failure

Fault Displacement

Suspected faults in Napa County roughly parallel the Northwest-Southwest course of the San Andreas Fault and are shown on Figure 85. Active faults include the Green Valley Fault, West Napa Fault, Cordelia Fault, and Hunting Creek Fault. All active faults in California must be mapped in order to comply with the Alquist-Priolo Special Studies Zones Act. The act requires a geologic report for any development proposed (except single-story, wood-frame housing) within a band one-eighth of a mile on either side of the mapped fault trace. Active fault mapping under the act is an ongoing process.

Ground Shaking

Whereas faulting is a localized phenomenon, ground shaking usually extends over many square miles and generally causes the most widespread earthquake damage. Experience in the United States indicates that wood-frame residences are probably the safest, while unreinforced masonry structures are the most dangerous structures. Bay Area faults, such as the San Andreas Fault and Hayward Fault, have and could again produce ground shaking in Napa County, although the epicenter might be located well outside the county. Local faults would also produce ground shaking.

Ground Failure

- Landslides - Slope instability often results in landslides during earthquake activity. The relative stability

of undisturbed slopes is shown in Figure 91. Original onsite investigations would be needed to pinpoint landslide prone areas with more detail.

- Liquefaction - Areas of Napa County with soils composed chiefly of sand, particularly in high water table and wetlands areas, are susceptible to liquefaction, a process that may occur during an earthquake. Figure 94 indicates areas subject to liquefaction in Napa County.

- Subsidence - In Napa County subsidence, generally level, vertically-downward earth movement caused by reduction in soil water pressure, would likely be restricted to areas of sandy soil and marshlands.

Flooding

Tsunamis, seiches and dam failures are covered in pages 330-338.

Secondary Hazards

In addition to the above principal hazards resulting from earthquakes, there can also be secondary hazards arising from damage to lifelines and critical facilities. For example, electrical lines can topple causing fires that cannot be fought due to ruptured water mains and road blockages. These types of secondary hazards are discussed in pages 356-372.

Geologic Hazards and Planning Processes

The enforcement of the engineering standards of the Uniform Building Code is the responsibility of the County Building Inspection Division. Public facilities design, including suitable road foundation design, and enforcement of the adopted grading ordinance is the responsibility of the County Public Works Department. Important as these functions are in providing safety from geologic hazards and avoiding extreme public maintenance and repair costs, the appropriate standards are applied after the decision has been made to open an area of the County to development, and after the design of projects is approved. These earlier decisions are the task of the Planning Agency, which, therefore, has the primary responsibility for determining whether or not a geologic hazard is associated with land areas to the degree that the risk should be avoided by not exposing the area to development. In some areas geologic hazards may be manageable with special care and a greater than ordinary degree of engineering. However, slopes in excess of 15 percent are generally unsuitable for urban development, as indicated in various elements of the Napa County General Plan.

Information is not available for mapping geologic hazards at a level of detail which would enable all geologic hazards areas in the County to be precisely described. However, there are excellent indicators of related degrees of hazard including Countywide maps of geologic units with varying tendencies to slide, landslide deposits, slope and the boundaries of historic marshlands. These are shown on the Napa County Environmental Sensitivity Maps which are satisfactory references for identifying areas for appropriate general densities and types of uses in General Plan preparation and are also adequate to identify areas in which geology and soil should be thoroughly investigated prior to project approvals. At the present time only detailed investigations of each proposed development site can reveal the exact degree of geologic hazard associated with the property and the appropriate means of site engineering to minimize those hazards.

Policies for Geologic Hazards

1. Proposed extensions of urban or rural land uses, including but not limited to new residential developments, roads or highways and all structures proposed to be open to the public and serving 50 persons or more, into areas characterized by (1) slopes over 15 percent, (2) identified landslides, (3) former marshlands and (4) fault zones should be evaluated with regard to the safety hazard prior to land use decisions such as General Plan amendments, rezonings, or project approvals.
2. No extensive grading shall be permitted on slopes over 15 percent where landslides or other geologic hazards are present as identified on Napa County's Environmental Sensitivity Maps or would exist following construction unless the hazard(s) are eliminated or reduced to a safe level as evidenced by engineered plans submitted to and approved by the County Public Works Department.
3. Lots on hillsides formed for resale as lots, rather than as part of a subdivision development, should be large enough to provide flexibility in finding a stable buildable site and driveway location at a future time.
4. The County should not accept dedication of roads (a) on or jeopardized by landslides, (b) in hilly areas or (c) in areas subject to liquefaction, subsidence or settlement, which, in the opinion of the Public Works Department, would require an excessive degree of maintenance and repair costs.

5. The Building Inspection Division should analyze its slope failure records and, based on its findings, should recommend any needed improvements in the grading ordinance.
6. Urban development in reclaimed wetlands should be discouraged.
7. Rezone open space lands subject to extreme geologic hazards and geologically sensitive lands to the :GR (Geological Risk) Combination District.

FLOOD HAZARDS

Findings

Flooding in Napa County may have several causes. In most of the flood-prone areas of the County the risk to life from flooding is low, particularly in areas subject to creek overflows, although property damages may be a moderate risk. In reclaimed areas in which the land surface lies several feet below the high tide line, the risk of life loss and severe property damages is high.

Causes of flooding include:

- Levee failure
- High tides and storm waves
- Creek overflows
- Standing water from excess rainfall
- Dam failure
- Tsunami
- Seiches

Levee Failure

A major levee break can cause severe property damage and may also pose a hazard to life. In Napa County levees are found on the Napa River and are all privately owned. The Edgerly Island Reclamation District, the only such district in the County, has the Napa River on one side. The District has taxing power but has not levied the owners for maintenance of the levees.

Levee failures on Edgerly Island in the past have been repaired on an emergency basis, and water is pumped out in a matter of a few days. These emergencies are caused by high water overtopping and eroding the levee along the Napa River. The risk of levee failure can be expected to increase in the future through the natural processes of levee slumping and island subsidence estimated at an average rate of one inch a year.

High Tides and Waves

High tides and storm-driven waves occurring together can overtop levees and embankments and by wave actions can erode earthworks. Flooding of this type is limited to the south Napa County area near the Napa River. (See Levee Failure above.)

Creek Overflows

Creek overflows result when the surface runoff from a watershed exceeds the capacity of the creek channel to carry

the flow. This is most likely to occur during intense winter storms when the soil is saturated and cannot absorb much rainfall. Development in a watershed increases the frequency and height of floods in the lower watershed because of grading, paving, roofs, siltation and storm drains, but would have relatively less impact on the very large, low risk 100 year flood. Smaller more frequent floods may occur on major and minor creeks throughout the County. In general, a natural creek will carry no more than the flow of a 10 to 20 percent flood. Any larger, less frequent flow may cause flooding to some degree outside of the channel itself.

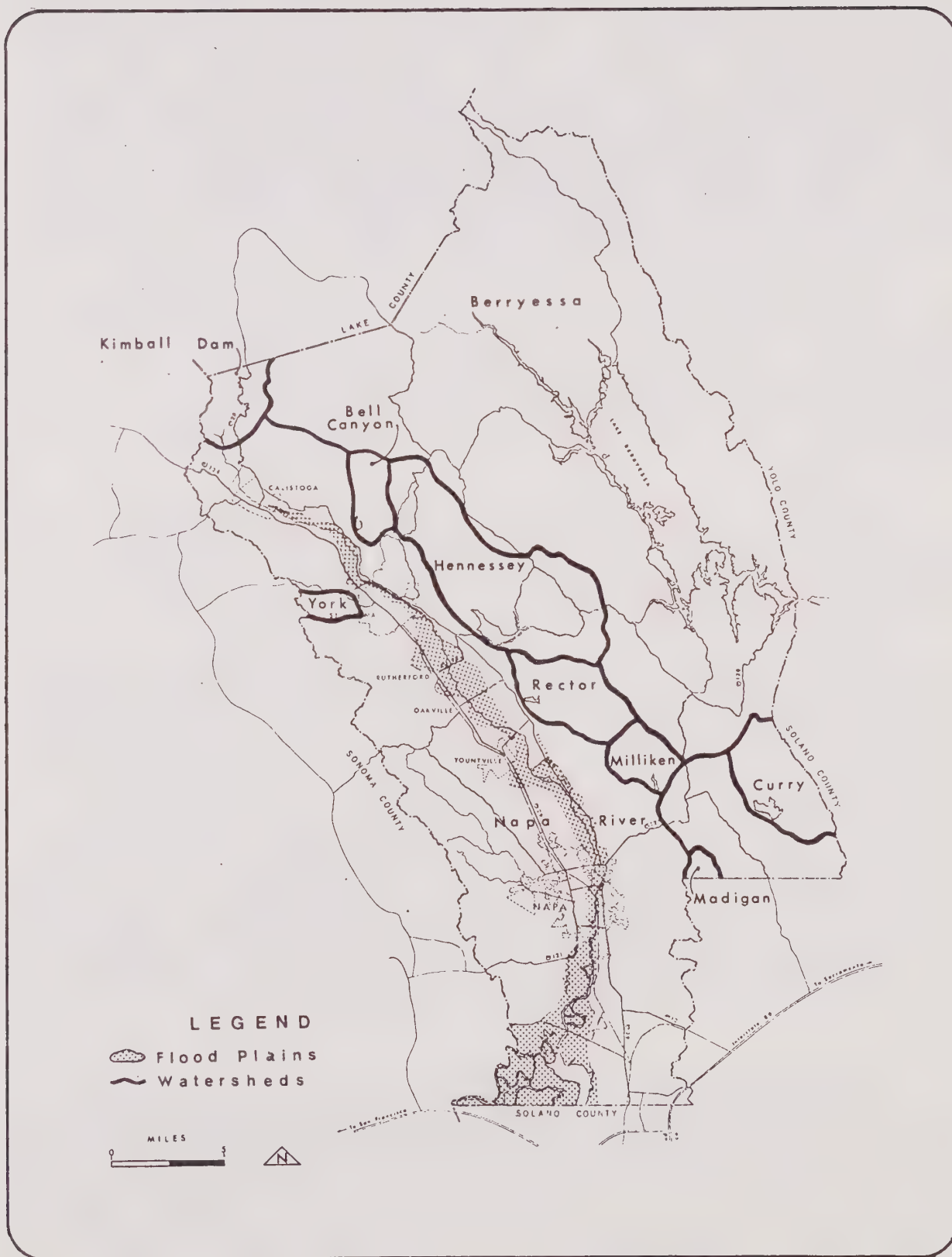
Flood hazards are estimated as the risk in any year (such as a one percent risk), or as an expected frequency of return over a very long period of time (such as a 100 year flood). If a project is designed to carry the four percent risk, a 25 year flood, the surrounding area would be protected from that degree of hazard and all smaller more frequent floods, but would still be subject to larger floods with a lower risk of occurrences.

Inadequate facilities such as small culverts and low bridges impede the flow of storm runoff in channels and thus may cause localized upstream flooding. These are usually older facilities which were adequate prior to development and the consequent increased runoff.

In urbanized areas near creek channels property damages often result more from bank failure than from flooding. Given the characteristic of streams to erode their banks, particularly when peak flows are increased by watershed development, the risk of bank failure can be expected to increase as development continues. It is not possible to predict exactly where or when a section of creek bank will fail, but in general this occurs on the outside of curves or in locations where the bank is undercut by high velocity flows. Although preventing channel bank failure is difficult and costly, the risk of major property damages can be avoided by setting buildings back from the top of the bank at a distance which would prevent them from becoming involved in bank failure. As a rule-of-thumb safety margin, a horizontal distance 1.5 times the depth of the channel is often recommended.

In Napa County there are some 44 creeks in addition to Napa River that are identified in Ordinance No. 627 that provides for the control and management of the flood plains of all the major streams in the unincorporated area of the County. The ordinance requires a permit for any acts that would alter the hydraulic characteristics of the water courses subject to the ordinance.

FIGURE 105: FLOODPLAINS AND WATERSHEDS



Standing Water

Standing water from excess rainfall occurs in low-lying and level areas where rainfall percolates slowly into the soil where surface drainage is poor because of the lack of natural drainage channels or because natural drainage channels have been obliterated by grading for development or agriculture. Standing water also occurs in low-lying areas along creeks where natural processes have created channel banks higher than the surrounding area. Leveed areas are subject to standing water which must be pumped out to the sloughs. Damages to crops and other property may result, particularly in a wet year in which water may stand on the land for weeks at a time. There are no standard risks for this type of flooding, but many areas subject to standing water experience inconvenience and minor property damages virtually every year. Hazards to life from standing water are low; limited to risks of well contamination and sewage contamination of standing water.

Dam Failure

The areas subject to flooding from dam failure have been determined by the California Office of Emergency Services and the consequence of such failure could be extreme where developed areas would be inundated. A major dam collapse could subject urban areas to possible loss of life and severe property damages.

Figure 106 locates 10 dams in Napa County for which inundation maps have been prepared. The Flood Control District has indicated on maps of the inundation areas the recommended emergency services such as 1) mass care and feeding stations, 2) emergency operations center, 3) hospital facilities and 4) emergency evacuation route for each dam. Figure 107 is a sample detail of one of these maps.

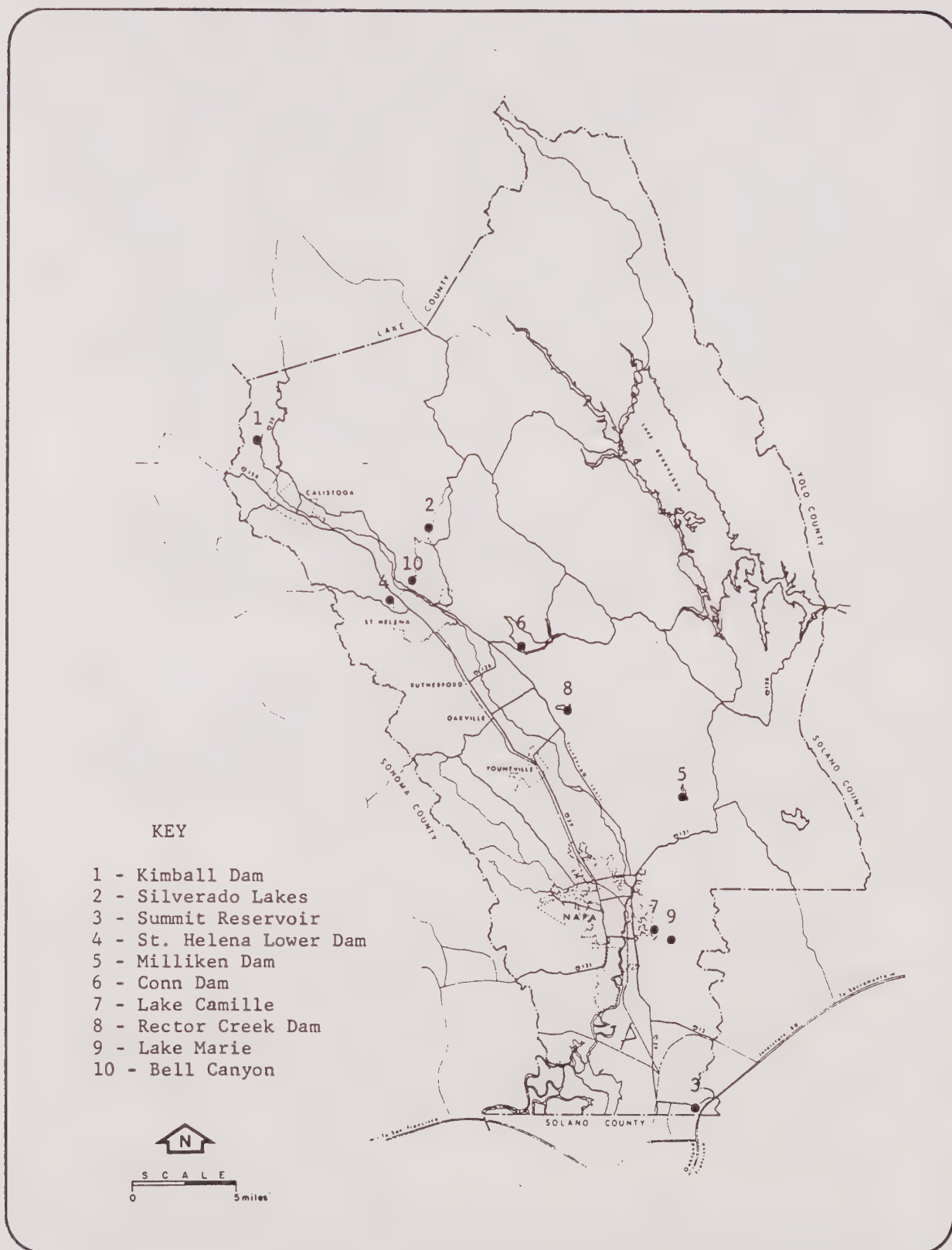
Tsunami

Tsunami, commonly called "tidal waves," are caused by earthquakes on the ocean floor. Estimates made by the U.S. Geological Survey indicate that the risk of a damaging event is extremely low, approximately a 0.5 percent risk in any year, and that the degree of hazard is also low, having a maximum runup height of ten feet at Point Richmond and one foot at Carquinez Strait. Consequently the risk to Napa County is low and no action is required by the County.

Seiches

Seiches are another type of water wave generated by earthquakes, landslides, strong winds and volcanic activity on

FIGURE 106: INUNDATION MAPS FOR NAPA COUNTY



(Source - Napa County Flood Control District)

FIGURE 107 INUNDATION MAP FOR RECTOR CREEK DAM

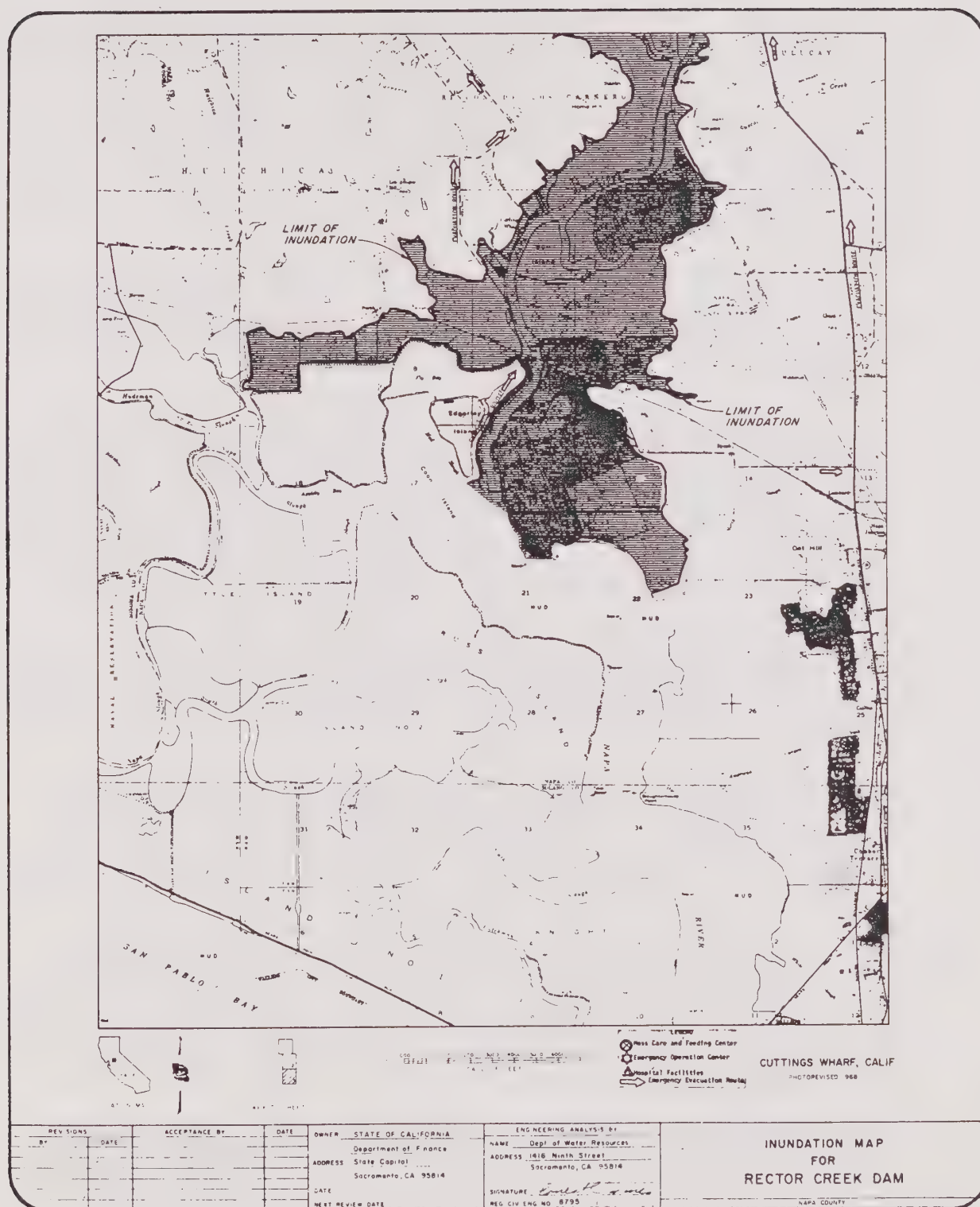


REVISIONS

BY	DATE	ACCEPTANCE BY	DATE	OWNER	STATE OF CALIFORNIA	ENGINEERING ANALYSIS BY
					Department of Finance	NAME Dept. of Water Resources
					Address State Capitol	ADDRESS 1416 Ninth Street
					Sacramento, CA 95814	Sacramento, CA 95814
					DATE	SIGNATURE
					NEXT REVIEW DATE	REG CIV ENG NO. A795

INUNDATION MAP FOR RECTOR CREEK DAM

FIGURE 107 (Continued)



a closed body of water such as pools, ponds and lakes. Large earthquakes seem to generate seiches at great distances because their energy is often dissipated slowly. Larger bodies of water such as Lake Berryessa, Lake Hennessey and other reservoirs would be subject to seiches. Although the risk may be low, development setbacks from shorelines would mitigate most damage to property.

Policies for Flood Hazards

1. A uniform set of flood damage prevention standards should be established by the cooperative efforts of all County, State and Federal agencies with responsibilities for flood control works and development in flood-prone areas in Napa County.
2. The unincorporated areas of the County which are subject to the provisions of the Flood Insurance Program (Ordinance #627 - Flood Plain Management) provides that new developments will be safe from a one-percent flooding occurrence. This is done by reservation from constructing in designated floodways and requiring new construction in the flood plains to be above the 100 year flood elevation.
3. Planning Department and Flood Control District review of any significant project proposed for areas in the County which are not presently in Flood Zones should include an evaluation of the potential downstream flood damages which may result from the project.
4. In order to protect lives and property, intensive urban and suburban development should not be permitted in wetland areas unless flood protection in such areas is constructed to the standards of the Flood Disaster Protection Act of 1973.
5. The County Flood Control District should proceed with drainage improvements in areas subject to flooding from inadequate facilities, and insure that additional new drainage facilities, including road culverts and bridges, are designed to pass the flow specified in the Napa County Ordinance Code.
6. Development proposals should be reviewed with reference to the dam failure inundation maps in order to determine evacuation routes.
7. The County will protect the public interest in drainage systems and water impoundments from sedimentation, siltation, and contamination and ensure that urban, agricultural and resource development projects utilize sound short-term and long-term erosion control measures.

6/7/83

TRANSPORTATION HAZARDS

Findings

Transportation related safety hazards in Napa County include blockage of evacuation routes in time of disaster (including minimum road widths) and the transportation of hazardous substances into and through the County.

Evacuation Routes

In the event of a disaster in Napa County, the exact size of the evacuation area and the precise evacuation routes would be determined by the type and extent of the disaster. Fire, earthquake, or potential dam failure are usually point sources and could require evacuation of relatively small damaged or potentially damaged areas. Widespread activity such as war-caused disasters, air raid alarms, or air pollution disasters could require evacuation of larger areas than the point source disasters discussed in this Safety Element.

Maximum lane capacity is one factor of several governing the carrying capacity of evacuation routes and is an important consideration in the Safety Element. It must be noted that roads are not designed for evacuation routes but are designed for "normal" operation. The most important roads that would be used as evacuation routes are Highway 29 and Silverado Trail.

1. Total reliance should not be placed on mutual aid pacts because other communities will have their own problems. A major earthquake will effect the entire Bay Area. Freeway damage in other parts of the Bay Area may affect this area as well.
2. Freeway overpasses on Highway 29 can be expected to be damaged by a major earthquake requiring emergency vehicles to use alternative routes to reach Browns Valley and west Napa.
3. Landslides could be reactivated and cause temporary blockage of the following routes (see also Figure 108):
 - a. Routes 12 and 121 access to Sonoma County at log retaining wall near Napa Road and Stornetta Dairy.
 - b. Route 128 at Lake Hennessey by slides on Pritchard Hill and Sage Canyon.
 - c. Dry Creek Road to Sonoma County by slide to the south for 1 mile east of the Sonoma County line.

- d. Temporarily isolate Lake Berryessa by closures of Pope Canyon Road west of Knoxville Road.
- e. Pope Canyon Road near Walter Springs.
- f. Vicinity of Knoxville Road-Route 128 intersection.
- g. Knoxville Road south of Spanish Flat.
- h. Circle Oaks Wooden Valley portion of Route 121.
- i. Rock falls on Route 128 between Wragg Canyon and Solano County line.
- j. Chiles and Pope Valley Road north of Chiles Grist Mill site.
- k. Howell Mountain Road between Angwin and Silverado Trail.
- l. Spring Mountain Road.
- m. Knoxville Road near Knoxville.
- n. Petrified Forest Road.
- o. American Canyon Road west of Interstate 80.
- p. Route 29 south of Lake County.
- q. Wooden Valley Road between Highway 121 and the Solano County line.
- r. Jameson Canyon Road (Route 12).
- s. Approaches to Carquinez Straits and Benicia Martinez Bridges containing fill or overpasses that may fail.
- t. Highway 29 between Napa and the Solano County line may be subject to liquefaction and/or flooding in some areas.

Transportation of Hazardous Substances

According to ABAG, there is at least one spill of hazardous substances under transport recorded each day in the Bay Area. Although the risk of such a hazard may be lower in Napa County, than in some other Bay Area counties, there are hazardous substances transported into and through Napa County that require preventive programs as well as emergency response.

6/7/83

Current U. S. Department of Transportation regulations list 1,800 hazardous substances which run the gamut from common household items such as paint and ink to extremely hazardous materials such as chlorine or liquefied gasses. Most of the federal regulations relating to the transport of hazardous materials were established by the Hazardous Materials Transportation Act of 1975. This Act provides the U.S. Department of Transportation with authority to regulate all safety aspects of hazardous materials transportation. The Motor Carrier Act of 1980 requires carriers of hazardous materials to demonstrate their ability to pay for damages sustained from an accident involving such materials by means of adequate insurance.

The major types of hazardous substances transported in Napa County are pesticides and fumigants for agricultural purposes, chlorine for sewage and water treatment, PG&E natural gas for heating, gasoline for internal combustion engines and bulk gas such as propane for heating. These and other hazardous and toxic substances routinely travel over highways in Napa County daily. The routes used, the specific types of substances transported and the nature and degree of hazard associated with the substances is not really known by any agency. Local agencies such as police and fire departments are generally not informed or equipped to respond to hazardous materials that spill.

In response to this situation ABAG is developing a coordinated hazardous materials accident prevention and emergency response program to serve the Bay Area. Representatives from Napa County, the City of Napa and the City of St. Helena are participating on a Hazardous Materials Spills Task Force which provides direction and technical assistance to ABAG.

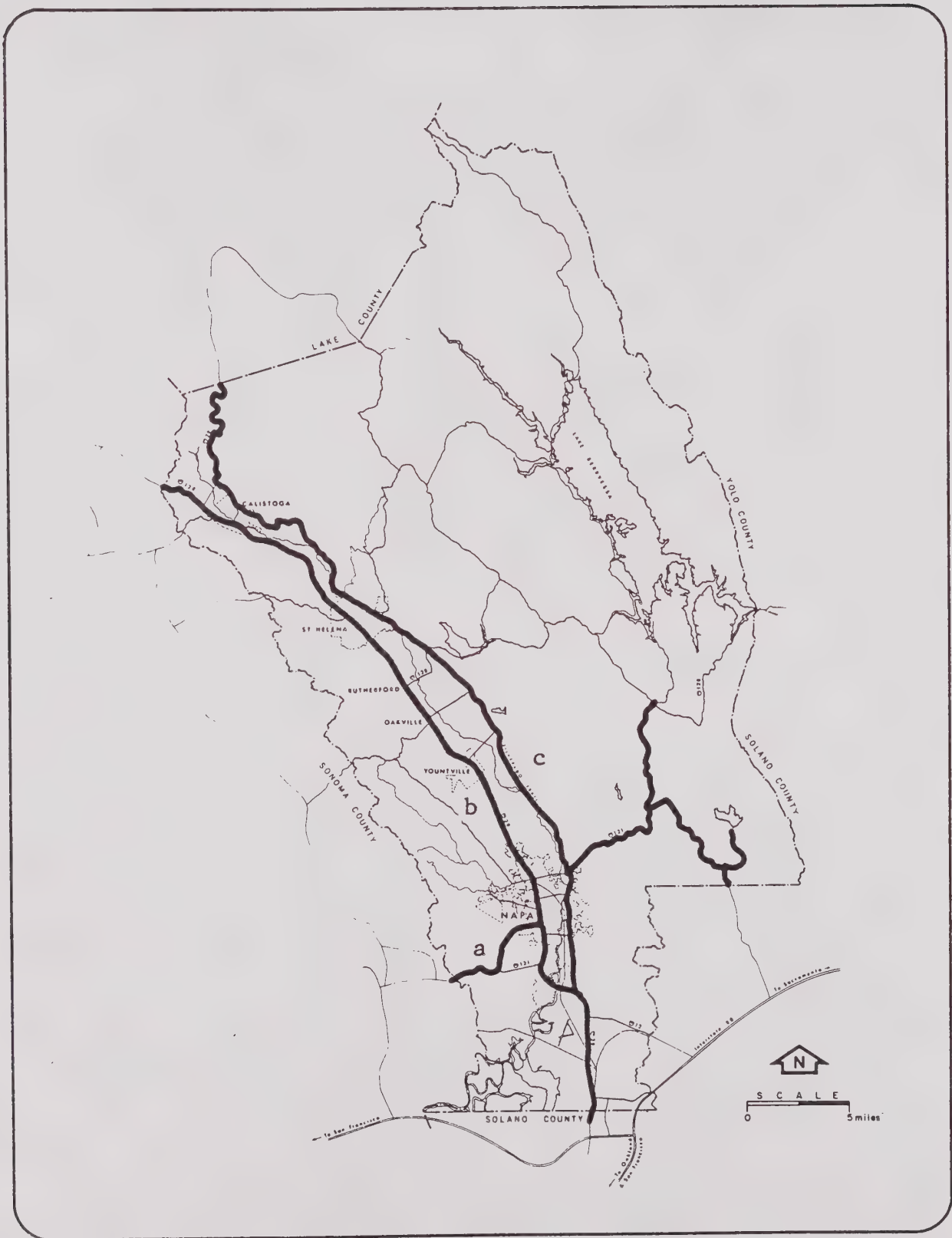
Policies for Transportation Hazards

1. The following evacuation routes should be used in a state of disaster as one-way routes with stalled cars moved aside to keep traffic moving (see also Figure 109):
 - a. SR 12, one way "West to East" Napa Sonoma County line to junction of Old Sonoma Road. One way "West to East" on Old Sonoma Road to holding area (Ridgeview Jr. High School).
 - b. SR 29, one way "South to North," Napa Solano County line to Calistoga then SR 128 Calistoga to Sonoma County. (Maximum capacity, 800 vehicles per hour)
 - c. SR 29, one way "South to North" Napa Solano County line to Imola Traffic Signals. Lanes N-1, N-2 north on

SR 121 to Junction Trancas Road and Silverado Trail, north on Silverado Trail to Junction of SR 29 at Calistoga north on SR 29 to Lake County. (Maximum capacity 700 vehicles per hour)

2. State and federal agencies with responsibilities for regulating the transportation of hazardous materials should be requested to review regulations and procedures, in cooperation with the County, to determine means of mitigating the public safety hazard in Napa County.
3. When an emergency occurs in the transportation of hazardous materials, the County Office of Emergency Services should be notified as soon as possible.
4. Industry should be encouraged to utilize underground pipelines, rail, and water transportation of hazardous materials to the greatest extent feasible to take advantage of the greater separation from the general public provided by these modes of transportation.
5. The County shall cooperate with other local jurisdictions to develop intra-county evacuation routes to be used in the event of a disaster within Napa County.

FIGURE 109: EVACUATION ROUTES



EMERGENCY WATER SUPPLIES

Findings

Surface-water supplies from reservoirs, lakes, or streams can be readily destroyed, contaminated, or otherwise rendered unusable as a result of a disaster. In contrast, ground water cannot be lost suddenly and water in deeper aquifers cannot be readily contaminated by a disaster. Wells drawing their water supplies from other than shallow aquifers, therefore, generally provide a satisfactory and reliable source for an emergency water supply.

For emergency domestic use, such factors as well yield, construction, source of power, accessibility, and water quality are important. For general-utility use, such as for washing, flushing, or firefighting, little or no importance may be associated with the construction and water-quality characteristics.

Many water-supply systems in the San Francisco Bay region are vulnerable to failures resulting from earthquakes, nuclear explosions, floods, or acts of civil disorder. Yet few, if any, of the water-supply agencies maintain adequate standby sources of water, or have prepared detailed plans that consider alternative sources of water supply. It is the purpose of this chapter to present sufficient information for Napa Valley to facilitate the development by local officials of an emergency water-supply plan for that area. The chapter presents general criteria for sources of emergency water supply and data for selected wells in Napa Valley.

Principal Sources of Existing Water Supply

In Napa County the water needs are supplied from surface runoff reservoirs, underground storage basins and imported water from watersheds outside the county. In the Napa Valley portion (Napa River drainage basin) of Napa County about 75 percent of the domestic water supply comes from surface impoundments. The major existing storage reservoirs are listed in Figure 110 below.

FIGURE 110: MAJOR WATER RESERVOIRS IN NAPA VALLEY

<u>Name</u>	<u>Average Annual Yield (Acre-Feet)</u>
Lake Hennessey	11,000
Rector Reservoir	3,300
Bell Canyon Reservoir	1,640
Milliken Canyon Reservoir	1,580
Kimball Canyon Reservoir	360

Source: Engineering-Science, Inc.

Napa County residents are served by eight "large" water agencies (municipal systems, water companies with more than 200 service connections and institutions serving more than 500 persons) and about 60 "small" agencies (less than 200 service connections). About 45 of the 60 "small" agencies are resorts, motels, restaurants, camps, schools and other entities using wells and springs for their customers, students and employees. The remaining "small" water agencies sell water to the public on a retail basis and are described below in Figure 111. The "large" water systems serving unincorporated areas of Napa County are listed below in Figure 112. Maps of the American Canyon, Friesen Angwin and PUC water distribution systems are found in Figures 112, 113, 114 and 115.

Fire Protection and Peak Load Water Supply Requirements

Water supply is considered the single most important factor in fire protection./1/ The key elements considered in this study are, 1) the required fire flow and duration of the fire flow, 2) size and layout of water distribution lines and, 3) the general adequacy of hydrant distribution. These elements, while not all inclusive of the factors considered by the American Insurance Association (AIA) and fire protection organizations, are nevertheless essential to effective protection and receive considerable attention by the AIA in assigning fire insurance rating classifications.

/1/ The AIA Standard Schedule assigns water supply 34% of the total rating points in grading municipalities and communities as to their fire defenses and physical condition.

A. Fire Flow

The required fire flow is the estimated amount of water, usually expressed in gallons per minute, needed to control the largest possible fire in the immediate area.

FIGURE 111: "SMALL" WATER AGENCIES IN NAPA COUNTY

Name of Agency	Service Area Location	Number of Service Connections	Source(s) of Water
Holger Christian Mutual Company	Deer Park	10	well
Pine Knoll Mutual Water Company	Deer Park	15	Friesen-Angwin Water Company
Vailima Estates Mutual Water Co.	Deer Park	3	well
St. Helena Hospital and Health Center	3 mi. north of St. Helena	1	10 springs
Meyer's Water Supply System	Edgerly Island	76	well
Bentley Water Corp	West of Calistoga	12	City of Calistoga
Dietz Water System	West of Calistoga	3	City of Calistoga
La Jota Mutual Water Company	Southeast of Angwin	10	Spring
La Tierra Heights	South of Angwin	15	well
Linda Falls Terrace	South of Angwin	12	well
Linda Vista Mutual	North of Deer Park	50	well
Lucchesi	East of Napa	30	well
Whittorn	Cuttings Wharf	6	well
Winrich	Cuttings Wharf	6	well
Tucker Acres	Southeast of Calistoga	7	well
Congress Valley Water District	Southwest of Napa	50	City of Napa
Jones		3	City of Calistoga

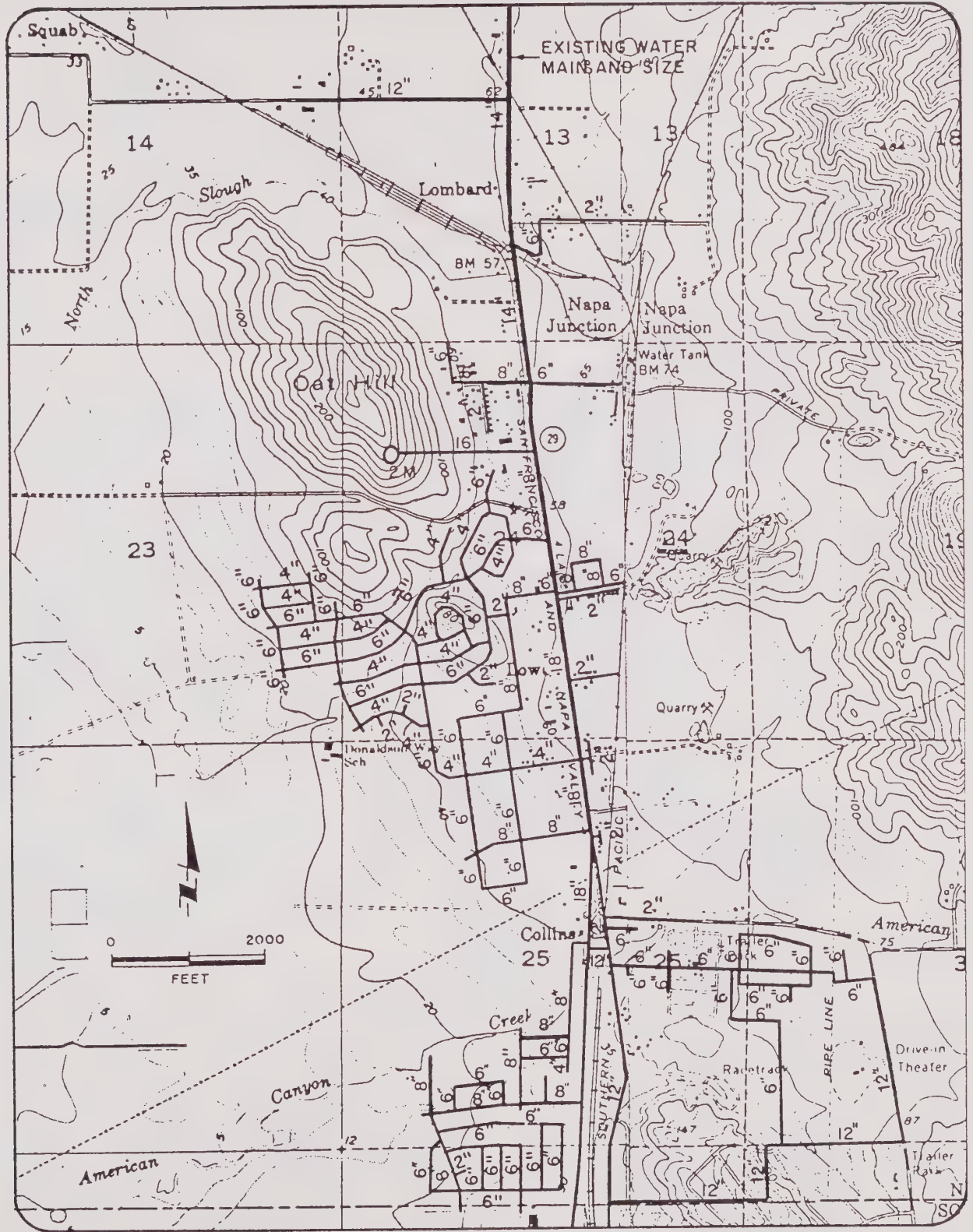
Source: Engineering Science, Inc.

FIGURE 112: LARGE WATER AGENCIES IN NAPA COUNTY

<u>Name of Agency</u>	<u>Unincorporated Population Served</u>	<u>Source(s) of Water</u>
City of St. Helena	900	Reservoirs
Pacific Union College	2,000 students; 400 faculty; 100 residents	wells/spring
Friesen Angwin Water Company	1,400	Reservoirs wells/spring
Deer Park/St. Helena Hospital and Health Center	850	Springs
American Canyon County Water District	4,000	City of Napa/ North Bay Aqueduct
City of Napa	6,900	Reservoirs/ North Bay Aqueduct
City of Vallejo	200	City of Vallejo
City of Calistoga	250	Reservoir/wells

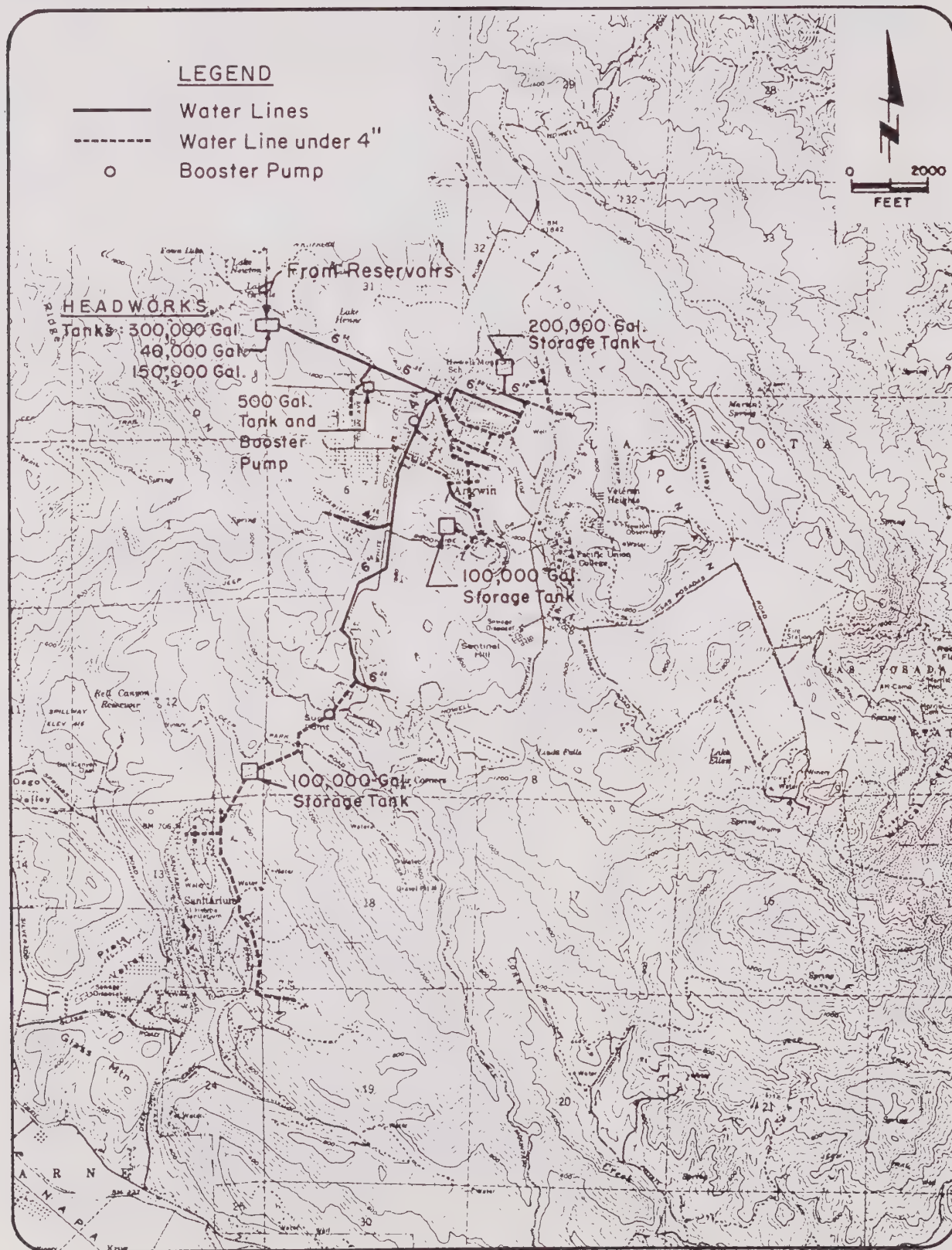
Source: Engineering-Science, Inc.; Napa County Environmental Health Division.

FIGURE 113: AMERICAN CANYON COUNTY WATER DISTRICT WATER LINES



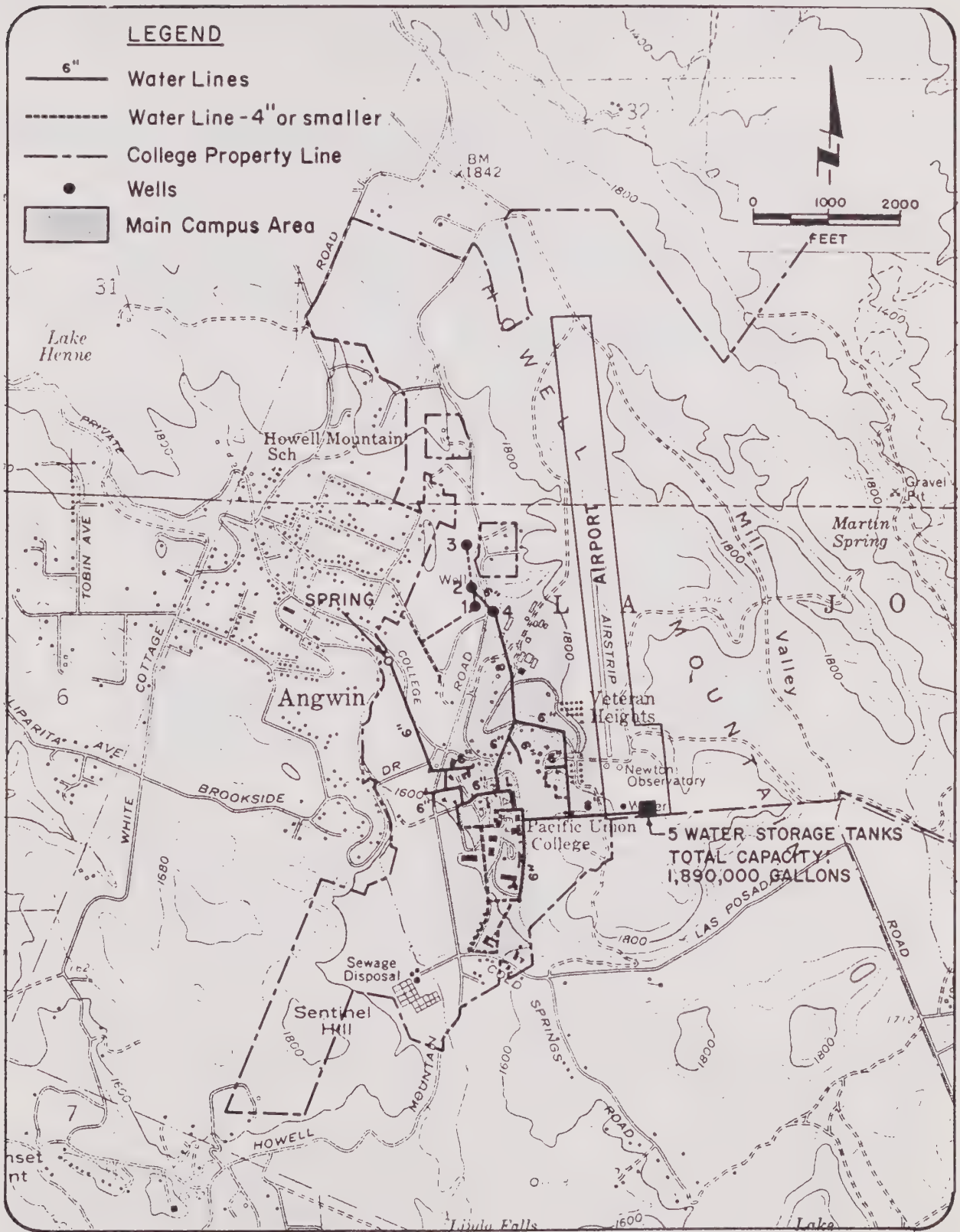
Source: American Canyon County Water District

FIGURE 114: FRIESEN ANGWIN WATER COMPANY WATER DISTRIBUTION SYSTEM



Source: ENGINEERING-SCIENCE, INC.

FIGURE 115: PACIFIC UNION COLLEGE WATER DISTRIBUTION SYSTEM



Source: ENGINEERING - SCIENCE, INC.

1. Objectives - The objective is to deliver water in sufficient volume to provide the required fire flow to fire department pumping apparatus which develop the required pressure for hose streams.
2. Standards - The standards of the American Insurance Association (AIA) (formerly the National Board of Fire Underwriters) are the recognized authority throughout most of the United States.

Required fire flow standards can be calculated by various methods. Two approaches of the AIA are as follows: 1) determine the fire flow requirements based on the population of a community, and 2) determine fire flow requirements from structural conditions and building congestion of a community.

- a. Population - This method determines the required fire flow from the population of a community based on nationwide experience. In a rural area such as unincorporated Napa County, this method is not useful. This method has also been found to be inaccurate in some cases and is being replaced by a method of basing fire flow requirements from structural conditions.
- b. Structural Conditions - A formula for calculating fire flow based on floor area and building construction is used as an alternate method to population. The formula is $F = 18C(A)^{0.5}$ where F is the fire flow in gpm, C is a coefficient based on the type of construction and A is the building total floor area.

Industrial areas do not lend themselves to such general standards. Each industrial locality is considered individually. Factors considered include floor area, ceiling heights, building heights, construction materials, inflammability of goods stores, separation between buildings, and use of private protection such as sprinklers.

It should be noted that required fire flow must be maintained over a period of time in order to meet the need for sustained pumping in severe fires.

B. Water Supply

Sustained fire flow requires a water supply sufficient to meet high volume fire flow quantities over short duration. In an area dominated by wildfire hazards and dispersed, low density residential land uses, a water supply for both

domestic and fire fighting purposes is mandatory and should be geared to the degree of wildland hazard and the type and location of occupancy. Standards for individual structures should be established.

Policies for Emergency Water Supplies

1. Update documentation and evaluation of emergency water supplies in the Napa Valley and in places such as Gordon Valley, Wooden Valley and Lake Berryessa area which might receive evacuees from other areas.
2. Adopt fundamental principles that can assure a sanitary installation of a well at a reasonable cost. Although it is impractical to establish fixed well specifications that fit every local situation, there are fundamental principles to follow which largely follow those set forth by the California Department of Water Resources in 1981 and have the greatest potential as sources of emergency domestic supply:
 - a. Drill well on ground higher than nearby sources of contaminants and terminate the well casing above the ground. Where necessary, the ground surface at the well site should be built up with a gently sloping surface of several yards radius to facilitate the drainage of surface water away from the well in all directions. This precaution would have particular importance during a period of rain following a nuclear explosion for any contaminants would then tend to move away from the wellhead before entering the soil.
 - b. Seal the space between the well casing and the wall of the drilled hole (annular space) to a depth of about 50 feet to protect against contamination by the downward movement of surface water, contaminated ground water, or other undesirable fluid through the annular space to the intake part of the well. As a general rule, wells without surface or sanitary seals and wells that obtain water from depths less than about 500 feet below land surface should not be used until the water has been tested and declared safe for human consumption. In Napa Valley, the thickness of the seal appears to be less critical, for many domestic-supply wells of the area have been sealed only to depths of 20 to 30 feet below surface and apparently yield water satisfactory for drinking.

- c. Construct the well so that it denies entry to any contaminated or undesirable water contained in the water-bearing deposits.
- d. Provide minimum distances from a well to possible sources of contamination which are long enough to provide reasonable assurance that subsurface seepage of contaminated water will not reach the well. The following minimum distances (recommended by the California Department of Water Resources, 1981) are typical of good practice:

Sewer, watertight septic tank, or private privy -----	50 feet
Subsurface sewage leaching field -----	100 feet
Cesspool or sewage pit -----	150 feet

Barnyards, feedlots and animal holding areas should be downslope from the well and at least 100 to 200 feet away, depending upon drainage conditions.

- 3. Select wells as sources of emergency supply that are accessible at all times of the year. Some irrigation wells along unpaved roads may be relatively inaccessible, particularly following a prolonged period of rain, but would otherwise be acceptable sources of supply. Such wells should not necessarily be excluded from consideration, for if high-pressure fire hoses, portable irrigation pipe, or steel pipelines are available, water can be transmitted from these wells to more convenient locations.
- 4. Select well water for emergency domestic use that does not contain bacteria or dissolved substances in sufficient concentration, nor emit radiation at a sufficient rate to be harmful to the human body. In Napa Valley, water from most deep wells seems to meet this requirement.
- 5. Equip wells for emergency use with internal combustion engines as a source of alternate power. Electrical power will probably fail following some types of disasters. Those wells pumped by electrically-operated turbines may also be made serviceable by changing the pump heads to permit operation of the turbine by either belt-drive or direct-drive internal combustion engines, such as those that power tractors. Any pump powered by electricity may be made operable by connecting a portable generating plant of appropriate size and capacity to the pump motor.

6. Make measurements of natural radioactivity of water samples collected from wells to be used in an emergency to establish a standard of comparison for use after a nuclear explosion. A significant increase in radioactivity would indicate contamination of water from the wells.
7. Improve peak load water supply by:
 - a. Adopting policies and legislation to insure that water systems meet the American Insurance Association (AIA) standards such as gridiron water main layouts and discouragement of dead end mains.
 - b. Standardizing maximum distance between hydrants throughout the area as follows: Residential-500 feet; high value and high hazard commercial and industrial areas - 350 feet.
 - c. Requiring standardized hydrants which conform to the AIA standards in the area through mutual agreement of the county and local governments.
 - d. Develop standards for peak load water supplies and a process for assuring compliance prior to issuing building permit.

DISASTER PREPAREDNESS

The Purpose of Disaster Preparedness

The purpose of disaster preparedness is to safeguard people in the event of a major disaster. Disaster preparedness in action is the coordinated response of Federal, State or Local government -- often working together -- to an extraordinary emergency. The response calls for effective application of all available resources, as needed.

Disaster preparedness is not a separate function set apart from the normal responsibilities of government. On the contrary, disaster preparedness operations occur whenever a local government responds to any extraordinary emergency -- such as a forest fire, earthquake, flood or other natural disaster; a major explosion or accident, or the release of radioactive materials or toxic chemicals; or an unusual peacetime emergency such as a civil disorder.

Disaster preparedness is not a special unit or group of people standing by to save the day in case of a major disaster. Existing local government forces form the nucleus of preparedness, around which doctors and hospital staffs, the news media, industry, volunteers, and other groups organize. It is the need for COORDINATED EMERGENCY OPERATIONS involving all governmental and nongovernmental groups with the capacity to help save lives or minimize damage, that distinguishes extraordinary emergencies from the emergencies that local fire and police forces, or hospitals and doctors, deal with every day.

Disaster preparedness means that a jurisdiction is prepared to respond promptly to save life and protect property if it is threatened or hit by an emergency of any type, utilizing all available resources. This requires that planning be done and preparedness actions be taken before there is an emergency. The whole concept of emergency readiness can be summed up by saying that the forces of government, and all others with emergency missions, must be capable of a community-wide team effort which would coordinate the operations of police forces, fire forces, ambulances, hospitals, medical personnel, radio and television stations, and all other people and units able to help citizens under conditions of extraordinary emergency.

Disaster Preparedness Legislation/Organization

The principal Federal and State laws providing for disaster support are Public Law 93-288 (Federal Disaster Relief Act of 1974); California Emergency Services Act; California Disaster and Civil Defense Master Mutual Aid

Agreement; California Natural Disaster Assistance Act; and other federal statutes. Administratively the State of California through the State Office of Emergency Services has prepared a State of California Emergency Plan. At the local level the County prepared the County of Napa Emergency Plan in July, 1973; several amendments were made in January, 1981.

As the State Plan clearly sets forth, an emergency plan "must include provisions for actions to be taken at all levels of government before, during and after the onset of an emergency situation." The types of emergency situations include as a minimum: war, earthquake, seismic sea wave, flood, fire, civil disturbance, accident/incident (transportation and industrial) and pollution. The organizational structure for disaster preparedness rests with the State Office of Emergency Services and a local county or city Office of Emergency Services. The County OES is part of the County Administrator's Office. The local county emergency organization is illustrated in Figure 116.

Definitions

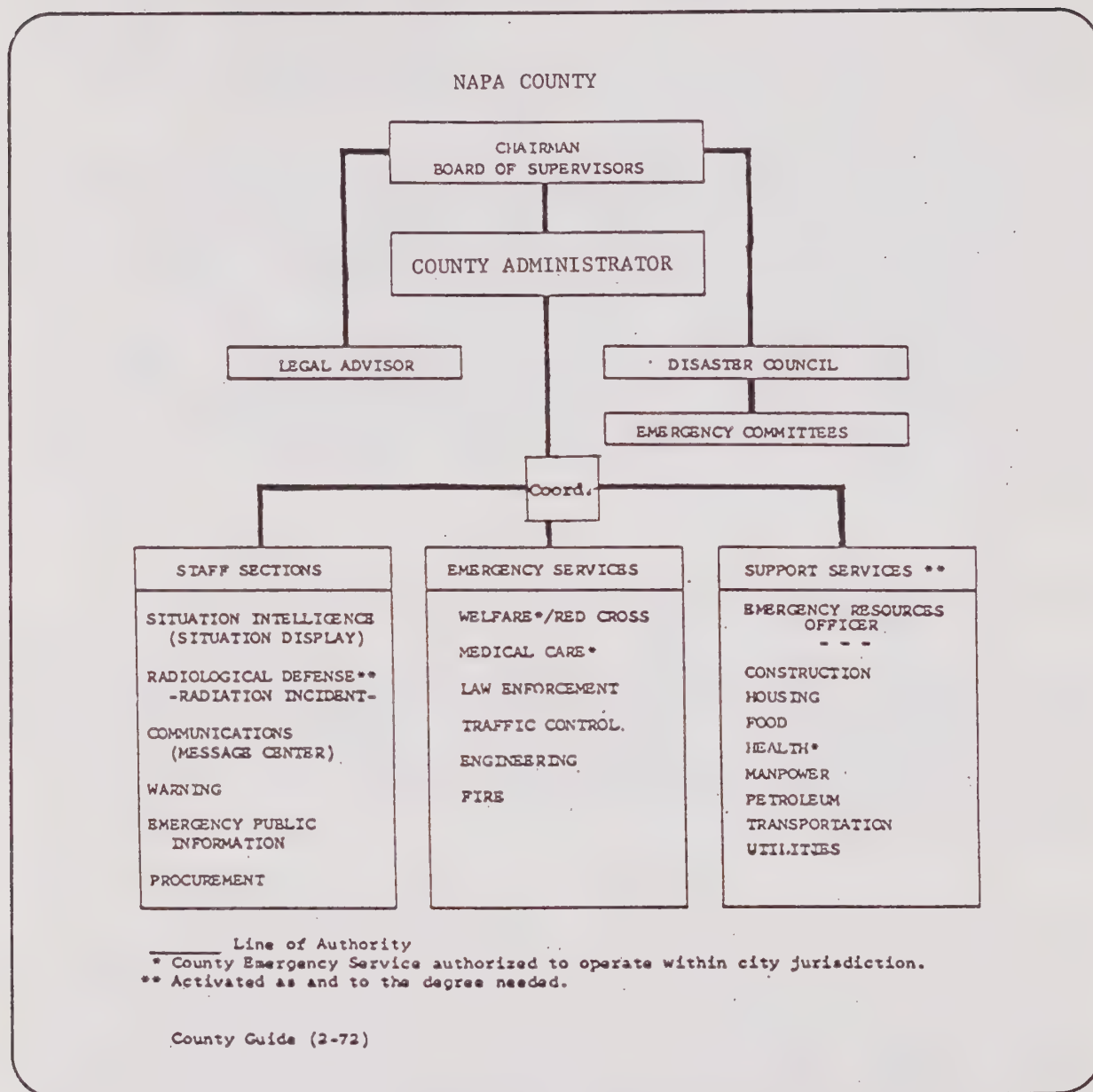
The three levels or degrees of emergency as stated in California legislation are:

(a) "State of war emergency" means the condition which exists immediately, with or without a proclamation thereof by the Governor, whenever this state or nation is attacked by an enemy of the United States, or upon receipt by the State of a warning from the federal government indicating that such an enemy attack is probable or imminent.

(b) "State of emergency" means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by such conditions as air pollution, fire, flood, storm, epidemic, riot, drought, sudden and severe energy shortage, or earthquake or other conditions, other than conditions resulting from a labor controversy or conditions causing a "state of war emergency," which conditions, by reason of their magnitude, are or are likely to be beyond the control of the services, personnel, equipment, and facilities of any single county, city and county, or city and require combined forces of a mutual aid region or regions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission.

(c) "Local emergency" means the duly proclaimed existence of conditions of disaster or of extreme peril to the safety of persons and property within the territorial limits of a county, city and county, or city, caused by such conditions as

FIGURE 116 EMERGENCY ORGANIZATION CHART



Source: Napa County Emergency Plan

air pollution, fire, flood, storm, epidemic, riot, drought, sudden and severe energy shortage, or earthquake or other conditions, other than conditions resulting from a labor controversy, which conditions are or are likely to be beyond the control of the services, personnel, equipment, and facilities of that political subdivision and require the combined forces of other political subdivisions to combat, or with respect to regulated energy utilities, a sudden and severe energy shortage requires extraordinary measures beyond the authority vested in the California Public Utilities Commission. (Stats. 1970, Ch. 1454, as amended by Stats. 1977, Ch. 169, Stats. 1977, Ch. 581).

County Emergency Plan

The State Emergency Plan states that all "political subdivisions will plan, prepare for and conduct emergency operations in order to accomplish the following objectives:

1. Preserve representative constitutional government.
2. Provide direction and control for the Emergency Organization.
3. Take actions to minimize loss of life and property.
4. Restore essential systems and services to sustain survivors.
5. Provide optimum management of essential resources.
6. Act in concert with contiguous states or other jurisdictions."

The County Emergency Plan states that its purposes are to:

- "1. Provide a basis for the conduct and coordination of operations and the management of critical resources during emergencies;
2. Establish a mutual understanding of the authority, responsibilities, functions, and operations of civil government during emergencies;
3. Provide a basis for incorporating into the county emergency organization non-governmental agencies and organizations having resources necessary to meet foreseeable emergency requirements."

Local Disaster Planning Assumptions for Earthquake

In disaster planning, a community must be capable of responding to its own problems, as well as to problems of other communities that affect them. They must also be prepared

to give assistance to the other communities that may be involved in a disaster. For this reason, it is important to have a good concept of how an earthquake will affect the entire bay area as well as the local area. As an example of the types of local impacts from a moderate earthquake on the Green Valley fault or a major earthquake on the San Andreas or Hayward fault, the following scenario portrays the numerous impacts and needs that could result from an earthquake.

Vital Needs. During a major earthquake the people of the Bay Area will have immediate vital needs for adequate food, shelter, and water supplies. In the East Bay Area the provision of water for consumption and fire fighting poses one of the most significant problems to be faced for the area. A large number of earthquake resistive structures found in the public school systems throughout the Bay Area are a major resource for temporary housing and feeding. Stocks of non-refrigerated foods will last for days. A food crisis should not be a significant problem for planning purposes.

Deaths and Injuries. Deaths, injuries, and damage in an earthquake will be affected by the size of the earthquake, the season of the year, and the time in which the earthquake occurs. Thus far, California has been very fortunate in that the combination of bad events had not occurred to create an untenable situation. A major earthquake in the East Bay Area would be an 8.3 magnitude quake centered on the San Andreas Fault or a 7.0 or larger magnitude quake centered on the Hayward fault. The number of deaths that might be expected in the Bay Area, not counting dam failures, is expected to range from 1,000 to 10,000. Injuries might well range from 4,000 to 40,000.

Communication. Communications of all kinds will be severely damaged in an earthquake. This includes TV, radio, newspapers, telephone, and telegraph. Heavy reliance will have to be placed on short wave radio communication. The police and fire services of the Bay Area have fairly good communications systems among themselves. There is not a good Bay Area multi-hospital communication network existing at this time.

Transportation. There will be severe damage to the highway, freeway, and bay bridge system in the Bay Area. This damage can be placed in five categories: a) earth failure due to landslides, or to the movement of structurally poor ground; b) overpass damage; c) damage to bridges which cross the San Francisco and San Pablo Bays rendering them unusable; d) disruption of the BART system; and e) extensive damage to airports. Local transportation delays will be long and quite troublesome. However, most of the confusion is expected to be over in several days.

Freeway damage such as collapse of bridges over the Napa River and other waterways and collapse of interchanges and overpasses at Highway 29 and Imola Avenue; Old Sonoma Road; Lincoln Avenue and First Street will require rerouting traffic and increase the time necessary to respond to emergencies.

Public Utilities. Water, electricity, natural gas and sewage systems, whether publicly or privately owned, generally are designed and operated in a manner intended to allow the system to remain in functioning condition after a disaster. However, despite good planning and good construction techniques and disaster plans, utility facilities are expected to experience considerable damage. This is true because earthquake forces and their effects are still imperfectly known, and certain geologic hazards can at best be only minimized.

- Water Supply. Movement on the Hayward fault would isolate the main East Bay Municipal Utilities District's storage areas from its main distribution system. In addition to the loss of water supply due to the ruptured aqueducts, many distribution lines cross the fault. These will also be ruptured. To counter this, major efforts have been made by EBMUD to increase their storage capacity west of the fault and within their distribution system. Despite the efforts of EBMUD to prepare for such a situation, disaster planning should assume that the hillside areas west of the fault in Oakland, Berkeley, Richmond, El Cerrito, San Leandro will be without water; some immediately, and others within several days, when their local storage reservoirs run dry.

Under earthquake stress, the North Bay Water Supply Aqueduct might break where it crosses the Green Valley Fault forcing reliance on emergency water supplies from wells and other local sources. (See Chapter VIII) If any water line adjoins a sewer line, it is quite possible that when breaks occur in both systems, there may be contamination of water supply, which happened in Anchorage in 1964.

- Electricity. Many main power lines cross faults on unstable ground. There will probably be less damage to overhead structures than to underground installations. There will, however, be damage to sub-stations, as well as to certain overhead lines. It is probable that the electric distribution system with its transformers will be substantially damaged.

Most utility lines cross the Green Valley fault in unstable ground in the Cordelia Area including two

natural gas and six electrical transmission lines. It must be expected that these will break further complicating the problem. While failure of the dams impounding Lakes Madigan and Frey is improbable, this occurrence would further complicate repair of gas and water lines.

- Natural Gas Lines. All major petroleum products and service lines servicing the San Francisco Bay Area cross the Hayward fault. These will all be cut by any major amount of displacement from a 6 or larger magnitude quake on the Hayward fault, at least 50% will probably be ruptured. If the rupture occurs during the height of the dry season, in the Berkeley hills and other surrounding areas, fire could be a very serious problem. Fire hazard could be spread during the rainy season as the petroleum might wash downstream with stormwaters into the sewers.
- Telephone. The telephone system incorporates back-up units and it is expected that it will function well following an earthquake. One problem, though, has been the over-use of the system after an earthquake, and this could cause its breakdown. The telephone company is presently working to solve this problem.

Although the telephone company is improving techniques to prevent damage, the newer equipment is more complex. This complexity may create a greater opportunity to overlook critical design and construction details. However, the record of the various telephone companies in assembling emergency equipment to provide communication has been excellent, even in the worst disasters.

Medical Care. Results from the San Fernando earthquake indicate that it is highly probable that a large quake will result in many hospital facilities and medical centers being severely damaged and out of operation. Many hospitals that may be able to function may be of limited use because utilities and transportation networks serving the hospitals will be out of order. Problems facing hospitals can be divided into five categories: a) life losses and injuries in hospitals; b) physical damage to hospitals; c) loss of medical supplies in hospitals; d) loss of hospital use; and e) unavailability of medical technicians and doctors because of transportation problems and the need to tend to their own families.

Schools. Severe problems are not expected to face the schools of the Napa County area and damage to schools in other areas would have relatively insignificant effect on Napa County.

Commercial Facilities. It is expected that damage within the long established downtown retail areas of San Francisco, Oakland, Berkeley, Richmond, Hayward and Palo Alto will be much heavier than those in the newer shopping centers located in the suburbs. A side effect of this damage may be that customers will change their shopping habits, assuming that such areas are more dangerous to shop in. This change may be permanent for some persons and months long for others.

Homeless. Dwelling units in the Bay Area will be damaged by many causes during the immediate post-earthquake period (fire, landslide, dam failure, etc.). If not damaged, many homes may well have to be evacuated below dams which are considered unsafe. The result for Contra Costa County alone, from an earthquake centered on the Hayward fault, of 6 magnitude or larger, could easily mean from 1,400 long-term homeless to over 10,000 homeless. This does not

include the number of people homeless due to the immediate evacuation of a dam as happened in San Fernando where 80,000 people were evacuated below the Lower Van Norman Dam.

Fire Following Earthquakes. With a quake of 7 or larger on the San Andreas fault, it can be expected that there will be large uncontrolled fires. However, it is not reasonable to expect a conflagration in terms of the 1906 earthquake. The closest approximation to this fire might be a fire in the Oakland-Berkeley hills during a dry spell. Such a fire would be hard to fight because of expected water shortages.

Dams. Failure of dams in the Bay Area could lead to the possible death of hundreds of thousands of people, if all the dams were unsafe and if the worse possible conditions were assumed. However, all the dams in the Bay Area are being re-evaluated for safety and appropriate corrections will be made if found unsafe. For disaster planning purposes, the dams and their location should be considered, and evacuation plans should be made whether or not a dam is presently considered safe. This type of planning is being done by the State Office of Emergency Services and the Napa County Emergency Services. (See also pages 333-338.)

Buildings and Other Structures

Groundshaking caused by an earthquake will affect all the structures in the quake area, even those which are not faced with the problem of fault break or ground failure.

In addition to the overall groundshaking effects on structures, the effects on portions of the structure and their contents may be the greatest single source of hazard from earthquakes. Effects on parapets and ornaments, on elevators and mechanical equipment, on toppling heavy furniture, storage racks, ceiling fixtures, exit enclosures, etc., present a great hazard to the public. One method of reducing these hazards from groundshaking is intelligent design and careful construction both in the structure itself and in the use and placements of its contents.

Many older buildings within Napa County were constructed before earthquake provisions were included in the building codes. Even newer buildings, built since earthquake provisions have been in the building code, may have been built at times when code enforcement was not very rigid or demanding. Because of this, some structures that were constructed with what were considered high standards at one time, may be more vulnerable to damage than was anticipated.

Within the area there are several so-called "dangerous buildings" made from materials such as unreinforced masonry. Fortunately, other buildings are mostly post-World War II and, therefore, this problem is not as extensive as in some areas of the United States. The economic impact of a major earthquake will not be as severe as in a city such as Santa Rosa or San Francisco with larger numbers of older buildings.

The area that may be affected by a tsunami is limited to low portions adjacent to the Bay, marshlands and certain industrial areas. Hazard from this source is relatively minor as compared to other sources for the County since few people live or work in these areas.

There are construction techniques that could alleviate or eliminate hazard from landslide; however, often they are not feasible economically. Therefore, the best approach is to avoid building in landslide areas. Similarly, there are construction techniques that can alleviate or eliminate the hazard or liquefaction potential. However, due to the cost involved, such practice generally is available only for significant projects.

Public and Quasi-Public Buildings

After any disaster, public buildings may have an important function unrelated to their normal use. Since they are public facilities, they can serve as refuge areas, rallying points and distribution centers for emergency supplies. Hence, their function can be more critical than the average commercial building.

As centers of refuge, public buildings may be unavailable because of their location with respect to flooding, faults, landslides or liquefaction zones or because of lack of earthquake-proof construction.

Firehouses constructed of unreinforced concrete blocks or masonry may be inoperable and may in fact be damaged to the extent that equipment is not available.

Even if fire and other relief equipment is available, there are large portions of the area that may be inaccessible. Freeway overpasses can be expected to be damaged so that alternate routes become mandatory. Landslides will affect secondary roads to certain areas as well as the freeways. (See pages 339-341.)

The Veterans Home Hospital may be inaccessible because of liquefaction of access roads, although the hospital itself might survive. Even if this hospital and others survive,

they will probably be inoperable or only operable under difficulties. The 1971 San Fernando and the 1972 Managua earthquakes have demonstrated that failures of mechanical equipment and elevators and loss of supplies may make operations difficult, and little or no help can be anticipated from other hospitals in the North Bay, for an earthquake generated by the Green Valley Fault will render some of the North Bay hospitals inoperative.

Hospital damage may result from medicine falling off shelves, from cabinets and equipment overturning, from ceilings and lights falling and from walls cracking.

Although the majority of the convalescent buildings in Napa County have the advantage of wood frame construction performance, they are subject to fire after an earthquake. The church buildings have several problems relating to parapet walls, concrete block construction, brick or stone ornamental veneer and clay tile on roofs. We must assume that at least some of these buildings will perform poorly due to these structural characteristics.

Industrial Buildings

Industry will be greatly damaged. Consequently, there will be a major readjustment of the work force, with consequent unemployment of the less-skilled workers. While large industries may retain their workers for clean-up and repair, smaller firms will have to release less-skilled workers and seek more highly skilled repair crews and mechanics - which will be in short supply after a major disaster that would affect the entire Bay Area.

Industry of all kinds will be greatly affected by a major earthquake. Some large plants in Napa County depend on sprinkler systems for fire protection. Sprinklers probably will not operate after an earthquake, primarily if water supplies are cut off. A large proportion of industrial plants are on potentially unstable ground. Many depend on complicated and extensive mechanical equipment that is peculiarly vulnerable to earthquake motions. The large warehouses and commercial buildings without extensive mechanical equipment generally are buildings which have tilt-up concrete walls and other masonry walls that are vulnerable to catastrophic damage, as the San Fernando earthquake has proved. Consequently, there would be a major readjustment of the work force, and subsequent unemployment of less skilled workers.

Within industrial areas, there are a large number of loading dock canopies which may be dangerous in an earthquake.

Commercial Buildings

Parapet walls are by far the most dangerous structures in cities. Older cities have a much larger proportion of older buildings constructed of unreinforced brick walls.

The greatest single cause of life loss in previous American earthquakes has resulted from the failure of unreinforced unit masonry, particularly unreinforced brick parapets on commercial buildings. Dangerous parapets can be corrected inexpensively and easily.

Some commercial and residential buildings have clay tile on sloping roofs. Much of this will be shaken off in an earthquake and will fall into the adjacent areas below. While recent law requires that tile must be fastened to the building, tile is brittle and hard shaking can still cause it to break and fall to the ground.

Marquees, large signs, and general ornamentation are present in commercial areas. Many of the roof signs or the signs over or adjacent to the sidewalk are not fastened adequately. Anchorages tend to weaken with age even when signs are attached to safe wood-frame buildings.

While there are very few large scale buildings subject to collapse in Napa County, the smaller buildings characteristic of this area typically have large display front walls and front walls that are often entirely open. This is not good structurally because the front wall is much weaker than the other three walls of the building. Consequently, the building twists in a torsional motion, amplifying the displacements at the front and causing considerable damage there. Many of the large glass show windows will break in an earthquake and the wall above the window can be damaged even if the building as a whole may not be seriously affected. This type of damage to the street front will create hazards for pedestrians in front of the structures.

Because some buildings in the County have been built since 1952 and since the vast majority of the commercial buildings in Napa County are of very small size, most of the dangers associated with earthquakes in commercial buildings do not include building collapse.

Apartment Buildings

The majority of the apartment buildings in Napa County are two- or three-story built under modern building codes. The record in other earthquakes has been that there is little life hazard in this type of construction; although it is inevitable that there will be some damage to property.

The first greatest hazard to small apartments will be the failure of ornamental masonry veneer including chimneys and fireplaces.

The second major cause of damage will be the effects of an error that became a part of the timber bracing section of the building codes some years ago. In small standard wood frame construction, Section 2517(g)3A of the 1982 Edition of the Uniform Building Code permits under "A," a let-in diagonal 1 x 4 brace to take lateral loads even without horizontal sheathing. The 1971 San Fernando Earthquake showed the fallacy of this construction practice by the numerous failures of 1, 1-1/2 or 2-story wood frame residences. To date the UBC has not removed this section.

The third major cause of possible damage to apartments may result from designs that provide for an open concrete or masonry deck which houses automobile parking with one or more floors of wood frame construction on top of the deck. Wood frame construction, in effect, uses a second floor concrete slab as the foundation of the wood frame construction above. Much of this concrete construction is designed with moment frame resistance without provision for ductile action. Because this type of construction has not yet been exposed to major earthquakes, no record of failures has been observed to date. However, we can anticipate that a large amount of damage and some building failure will result.

Policies for Disaster Planning

A. Improve Emergency Services Program

1. Improve the County's emergency services program with authorization to review and expedite implementation of appropriate federal, state, regional and local disaster recovery programs to include but not be limited to preparation of potential mass care facilities, hospital reserve disaster inventory modules, packaged disaster hospitals, disaster assistance centers, multi-purpose staging areas, emergency water, food and medical supplies, instruction leaflets, and emergency operating centers.

Objectives of the program should be part of the "management philosophy" of the county. Included in such a program should be policies:

- a. To coordinate a structural hazards inspection program and establish for the county's Board of Supervisors the necessary criteria for mitigation of hazards.
- b. To provide a basis for control and direction of emergency operations.
- c. To release disaster information in concurrence with other county Boards of Supervisors during or immediately after a disaster.
- d. To provide for the continuity of government in the event of a geologic disaster.
- e. To coordinate, repair, and restore essential systems and services as required in an emergency.
- f. To provide for the protection, use and distribution of remaining resources as well as surplus property available from the Federal Government for local government use.

2. Improve Emergency Rescue Service by:

- a. Reviewing and if appropriate, adopting the recommendations of the Division of Medical Science - National Academy of Sciences, and the National Highway Safety Bureau - Department of Transportation to serve as guidelines for improving existing emergency rescue service through the Emergency Medical Services Agency.
- b. Continuing the central dispatch system to handle police and fire communications.
- c. Continuing public helistops located near hospital areas for use, (a) by public and military emergency rescue helicopters, and (b) dispatch of medical supplies in times of emergency.
- d. Continuing coordination of a single disaster control program with all phases of rescue treatment included with fire and police departments and Civil Defense volunteers.

- e. Continue to coordinate operations with the emergency operations of other jurisdictions as necessary.

B. Improve County-wide Fire Protection

1. Continue to effectuate improved station distribution, manpower and equipment by:
 - a. Considering feasibility of establishing county-wide fire administration to coordinate the limited physical and manpower resources of the area.
 - b. Establishing coordination between adjoining Counties to ensure compatible station distribution without gaps in service areas of stations located unnecessarily close to one another along county lines.
2. Improve organization and financing by:
 - a. Encouraging feasibility studies of an area-wide approach to financing fire protection to more effectively cope with problems of Proposition 13.
 - b. Recommending initiation of program budgeting for each agency providing fire protection, either under the present localized fire organizations or under a recommended areawide organization.
 - c. Requiring mandatory referral to fire officials for proposed development sites and design plans for comment as to:
 - (1) Adequacy of water supply in relation to stand pipes, pipe size, pressure, and system layout.
 - (2) Site design for ability to move firemen and equipment in, and around, buildings.
 - (3) Location for ability to safely and effectively move fire equipment and rescue vehicles to the site.

C. Continue Hospital Safety Planning

1. Continue studies of existing hospital facilities for the adequacy of their earthquake resistance not only in relation to their structural design but also the geological stability or seismological vulnerability of the site.

2. Prevent the construction of vital critical facilities in areas of potentially hazardous ground movement, and encourage elimination or rehabilitation of all existing critical hospital facilities which have not been designed to be earthquake resistant.
3. Provide an extra measure of earthquake resistance and damage control of critical facilities which will allow such facilities to remain operative after a catastrophe.

D. Improve Mental Health Component of Disaster Program

1. Continue active involvement of mental health professionals on the County's Emergency Medical Services Committee.
2. Incorporate mental health concepts and programs in the County's Emergency Services planning process.

E. Improve Emergency Housing Capabilities

1. Give first priority to re-housing the victims of the disaster after mass care operations are underway.
2. Utilize Department of Housing and Urban Development funded leasing of vacant privately owned properties rather than mobile homes if feasible in event of disaster. This would maximize occupancy of local real properties, thus lessening the export of disaster relief funds out of the community.
3. Support state and federal legislation designed to amend tax laws that currently result in inequitable financial impacts on victims of disasters.

F. Improve Communications and Public Information Regarding Disasters

1. Implement the 911 dial system by October, 1983.
2. Consider the eventual establishment of one central communication headquarters and emergency operating center with a backup for disasters. This center would receive all alarms by telephone, alarm box, private systems and radio and would serve as fire dispatch and communications headquarters for the area. The backup center would have earthquake proof emergency power sources and construction.

3. Develop adhesive backed tags to disseminate telephone numbers for emergency fire and police services and radio frequencies in time of disasters.

G. Ensure Implementation and Updating

1. Upon adoption of this element, the county should re-establish a safety review committee to oversee the implementation of this element. This committee should be composed of the Director of the Conservation, Development and Planning Department, the Building Codes Administrator, the Director of Public Works, and the Director of the Office of Emergency Services and at least one representative from police and fire protection service agencies.
2. The Safety Element should be reviewed by the Conservation Development and Planning Department annually and should be comprehensively revised every five years or whenever substantially new scientific evidence or interpretations becomes available.
3. The Napa Office of Emergency Services shall continue to update the Napa Emergency Plan of 1973 annually and revise the Plan every four years.

4. APPENDIX

APPENDIX A: BIBLIOGRAPHY

Algermissen, S.T., et. al., 1972, "A Study of Earthquake Losses in the San Francisco Bay Area," a report prepared for the Office of Emergency Preparedness by National Oceanic and Atmospheric Administration (NOAA)

American Insurance Association (National Board of Fire Underwriters), "Information Bulletin No. 266"

American Insurance Association (National Board of Fire Underwriters, 1956), "Standard Schedule for Cities and Towns of the United States with Reference to Their Fire Defenses and Physical Conditions," New York.

American Planning Association, October, 1981. "Reducing Earthquake risks: A Planner's Guide," Chicago.

American Planning Association, July, 1982. PAS Memo, "Transport and Storage of Hazardous Materials," Chicago.

Association of Bay Area Governments (A.B.A.G.) 1970, "Public Information Program of Four County Bay Area Community Shelter Plan" pp. 39-42.

Association of Bay Area Governments, April, 1981. "Spill Prevention and Response Program for the San Francisco Bay Area," Berkeley.

Association of Bay Area Governments, March, 1980. "We're Not Ready for The Big Quake: What Local Governments Can Do," Berkeley.

California Department of Forestry, May, 1980. "Fire Safety Guides for Residential Development in California," Sacramento.

California Department of Forestry, April, 1973. "A Fire Hazard Severity Classification System for California's Wildlands," Sacramento.

California Department of Forestry, February, 1980. "A Report to the California Legislature Regarding Fire Prevention Programs of Counties and Cities with a Wildland Fire Potential," Sacramento.

California Department of Water Resources, 1961, Bulletin 99, "Recon, Report on Upper Putah Creek Basin," p. 253.

California Department of Water Resources, 1968, Bulletin 74, "Water Well Standards," p. 205.

California Division of Forestry, 1971, "California Aflame! September 22 - October 4, 1970."

California Division of Forestry, 1972, "Recommendations to Solve California's Wildland Fire Program."

California Division of Mines and Geology, 1963, Santa Rosa Sheet of the Geology Map of California, Sacramento, p. 1.

California Division of Mines and Geology, March 1970, Mineral Information Service, Santa Rosa Earthquakes of October, 1969.

California Division of Mines and Geology, 1973, "Urban Geology Master Plan," Sacramento, p. 112.

California Office of Emergency Services, 1974, "San Francisco Bay Area Earthquake Response Plan, Local Operational Data Manual for Napa County."

California Office of Emergency Services, 1977, "Disaster Assistance Procedural Manual," Sacramento.

California Office of Emergency Services, 1978. "State of California Emergency Plan," Sacramento.

Engineering-Science, Inc., June, 1971. "Comprehensive Area-wide Plans for Domestic Water and Sewerage Systems," Berkeley.

Contra Costa County, 1975. "Safety Element," Martinez.

Governor's Earthquake Council, 1972, "First Report," Sacramento, p. 64.

Highway Research Board, 1958, Landslides and Engineering Practice, p. 224.

International Conference of Building Officials, Uniform Building Code, Pasadena, 1973.

Joint Committee on Seismic Safety, 1972, "The San Fernando Earthquake of February 6, 1971 and Public Policy," California Legislature, Sacramento.

Los Angeles County, 1974. "Safety Element," Los Angeles.

Los Angeles Department of Regional Planning, 1974, "Preliminary Safety Element of Los Angeles County General Plan."

Metcalf & Eddy, Inc., October, 1973. "Napa County Water Resources Development Study," Palo Alto.

6/7/83

- Menci, V. & Guido, 2., 1967 "Landslides and their Control"
Elsevier, New York, p. 202.
- Moore, W. G., 1958, "Dictionary of Geography," Penguins Books,
Baltimore, p. 191.
- Napa County, February, 1980. Ordinance No. 627, "Flood Plain
Management," Napa.
- Napa County C.D.P.D., 1971, "Lake Berryessa Element of Napa
County General Plan."
- Napa County C.D.P.D., 1973, "Conservation and Open Space
Element of Napa County General Plan."
- Napa County C.D.P.D., 1974, "Seismic Safety Element of Napa
County General Plan."
- Napa County C.D.P.D., 1974, "Napa County Summary General Plan."
- Napa County Engineering and Road Department, 1971, "Napa County
Road and Street Standards."
- Napa County Fire Department/California Department of Forestry,
1981. "Annual Report Napa County Fire Department," Napa.
- Napa County Office of Emergency Services, July, 1973. "County
of Napa Emergency Plan," Napa.
- National Fire Protection Association, 1976. "Fire Protection
Handbook," Boston.
- National League of Cities, 1967, "The Grading of Municipal
Fire Protection Facilities."
- Orange-Seminole-Osceala Planning Commission, Florida, 1969,
"Fire Protection."
- San Fernando Child Guidance Clinic, 1972, "Testimony to U.S.
Senate Committee on Public Works," hearings on San Fernando
Earthquake of February 9, 1971.
- San Luis Obispo County, June, 1976. "Safety Element,"
San Luis Obispo.
- Sharpe, C. F. S., Landslides and Related Phenomena, Cooper
Square, New York, 1968, p. 137.
- Soil Conservation Service, "Report and General Soil Map, Napa,
California," 1966, p. 60.

- Tri-Cities Seismic Safety Committee, "Tri-Cities Seismic Safety Study," El Cerrito, Richmond, San Pablo, 1973, p. 199.
- University of California, August, 1978. "Goats for California Brushlands," Davis.
- U.C. Seismographic Station, September 3, 1969, Computer Print-out of Epicenters 1864-1966, Napa County.
- U.S. Bureau of Reclamation, 1970, Evaluation of Water Yield Potential in East Putah Creek Watershed.
- U.S. Department of Agriculture, Cooperative Extension, University of California, March-April, 1982. "Prescribed Burning: A New Program," Berkeley.
- U.S. Department of Agriculture, May, 1981. "Protecting Residences From Wildfires: a guide for home owners, lawmakers, and planners," Berkeley.
- U.S. Department of Commerce, September, 1978. "A Basic Guide for Fire Prevention and Control Master Planning," Washington, D.C.
- U. S. G. S., 1970, A.B.A.G. Bay Region Study, Basic Data Contribution #7: "Faults That are Historically Active or Show Evidence of Geologically Young Surface Displacement."
- U. S. G. S., 1971, Basic Data Contribution #9: "Preliminary Map of Historic Margins of Marshlands."
- U. S. G. S., 1971, Basic Data Contribution #11: "Estimated Relative Abundance of Landslides."
- U. S. G. S., 1971, Basic Data Contribution #15: "Flood Prone Areas in the Napa River Drainage Basin, Napa County, California."
- U. S. G. S., 1971, Basic Data Contribution #32: "Precipitation Depth - Duration Frequency Relations - Isopyetal Map."
- U. S. G. S., 1972, Basic Data Contribution #37: "Map Showing Distribution and Cost by Counties of Structurally Damaging Landslides in the Winter of 1968-1969."
- U. S. G. S., 1972, Basic Data Contribution #52: "Map Showing Areas of Potential Inundation by Tsunamis."
- U. S. G. S., 1972, Basic Data Contribution #53: "Sources of Emergency Water Supplies in Napa Valley."

- U. S. G. S., 1973, Basic Data Contribution #54: "Preliminary Geological Map of Solano County and Parts of Napa County."
- U. S. G. S., 1973, Basic Data Contribution #56: "Preliminary Geological Map of Eastern Sonoma County and Western Napa County.."
- U. S. G. S., 1974, Basic Data Contribution #67: "Preliminary Photointerpretation Map of Landslide . . . Deposits . . . of Napa County . . . "
- U.S.G.S., 1977. "A Map Showing Faults with Quaternary Displacement, Northeastern San Francisco Bay Area."
- U.S.G.S., Geological Survey Circular 690, 1974. "Seismic Hazards and Land-Use Planning," Washington, D.C.
- U. S. Office of Emergency Preparedness, 1971, "Q-Day + 100," an interim report May 20, 1971, on the federal response to the California earthquake of February 9, 1971: Executive Office of the President, p. 24.
- U. S. Office of Emergency Preparedness, 1972, "Federal Disaster Assistance Program Handbook," Executive Office of the President.

APPENDIX B: DEFINITIONS

Acceptable Level of Risk: The level of loss, injury or destruction below which no specific action by local government is deemed necessary other than making the risk known.

Conflagration: A large and destructive fire, usually aggravated by strong winds which carry firebrands over natural or manmade barriers.

Defensible Space: An area either natural or manmade where material capable of causing a fire to spread unchecked has been treated, cleared, reduced or changed in order to act as barrier between the advancing wildfire and the loss to life, property or resources.

Fuelbreak: An area, usually a long strip strategically located, wherein vegetative fuels are reduced in volume and maintained so as to produce a reduction of fire intensity if a wildfire burns into it.

Greenbelt: An irrigated, landscaped and regularly maintained fuelbreak, usually put to some additional use (e.g., golf course, park playground).

Mediterranean Climate: A relatively mild weather pattern characterized by winter precipitation and long, hot and dry summers.

Prescribed Fire: Fire used for land management purposes which is conducted under previously prescribed conditions of temperature, humidity, fuel moisture, wind speed and direction to achieve a specific purpose, e.g., fire hazard reduction, site preparation for planting, control of certain unwanted plants, plant disease control.

Urban/Wildland Interface: That line, area or zone where structures and other human development meets or intermingles with undeveloped wildland or vegetative fuels.

Wildfire: An uncontrolled fire, usually spreading through vegetative fuels but often consuming structures as well.

Wildland: An area in which development is essentially non-existent, except for roads, railroads, powerlines and similar transportation facilities. Structures, if any, are widely scattered and are primarily for recreation purposes. Includes large cattle ranches and forests managed for timber production.

APPENDIX C: FIRE SAFETY STANDARDS

Fire Safety Standards (Summary of California Department of Forestry, May, 1980, Fire Safety Guides for Residential Development in California, in or near forest, brush and grassland areas):

Access/Traffic Circulations: safe and ready access for emergency fire equipment; alternative routes of escape.

- access routes
- Right of Way road width
- Cul-de-sacs
- Street grades
- Street radius
- bridges

Street, Road and Building Identification - Names and Number: to facilitate fire location and to avoid delays in response:

- buildings and structures
- roads and streets

Roadside Vegetation: to protect escape routes from radiant heat caused by wildfires.

Water Supply: most important single factor in fighting structural fires and vital in suppressing wildland fires; to assure adequate to reliable water supplies.

- water mains
- fire hydrants
- water storage (2 hour fire flow)
- private water supply (min. 2,500 gallons)
- lakes, ponds, swimming pools, etc.

Power Utilities Systems

Roofing - most vulnerable part of building during wildland conflagration due to wind carried fire brands:

- tile roofs
- shake/shingle roofs
- roof sprinkler systems (unreliable)

<u>- Fire Hazard Severity</u>	<u>Type Roofing Required</u>
Extreme	Class A
High	Class B
Moderate	Class C

Building Construction Standards

- Uniform Building Code minimum
- Local regulations to supersede Uniform Building Code
- Eaves, Balconies, Unenclosed roofs and floors
(need 1 hour protection)
- Vents
- Chimney
- Exterior walls
- Rafters
- Windows

Building spacing and density

(based on fire hazard severity classification)

- 1) proper access roads
- 2) adequate water supply
- 3) materials more fire resistive
- 4) clearance requirements
- 5) greenbelt and fuel breaks

Vegetation Clearance (Public Resources Code Sec. 4291 SHALL:)

- fire breaks - 30' minimum
- fuel modification - 30' to 100'
when 30' not sufficient

- chimney and stove pipe
- overhanging vegetation
- accumulated roof debris

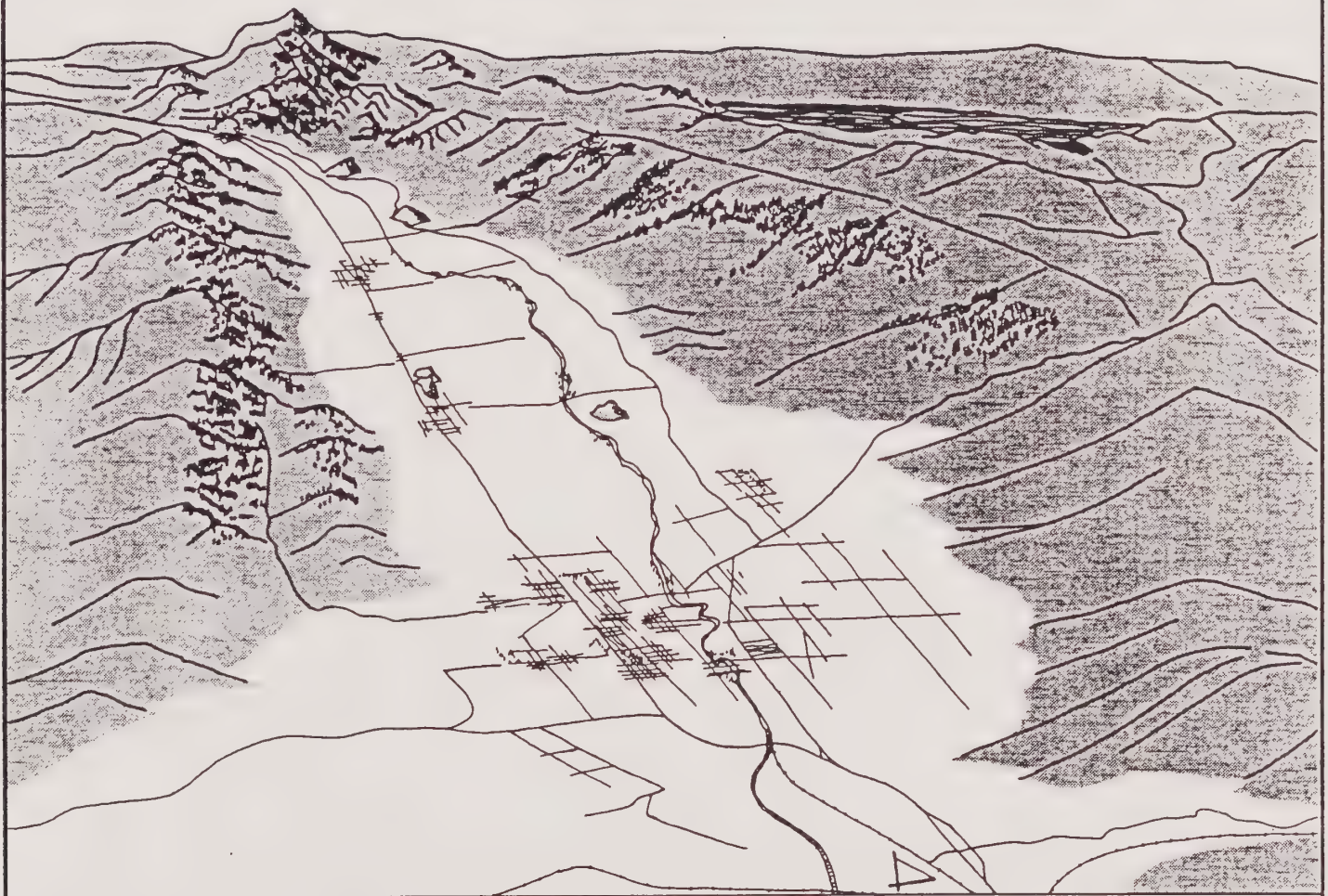
Plus (at local option):

- lot size and placement of buildings
- adjacent landowner responsibilities
- compliance with clearing vegetation

Fuel breaks and Greenbelts

- plan review
- design and construction
- access
- open space
- primary fuel breaks (min. 300' width)
- secondary fuelbreaks (min. 200' width)

NOISE



GENERAL PLAN

1. INTRODUCTION

The Noise Element of a General Plan provides a basis for comprehensive local programs to abate environmental noise and to protect citizens from excessive exposure to it. Fundamental goals of a Noise Element are:

- To provide sufficient information concerning the community noise environment so that noise may be effectively considered in the land use planning process. In so doing, the necessary groundwork will have been developed so that a community noise ordinance may be utilized to resolve noise complaint situations.
- To develop strategies for abatement of excessive noise exposure situations involving implementation of cost-effective mitigating measures in combination with re-zoning as appropriate to avoid incompatible land uses.
- To protect those existing regions of the study area whose noise environments are deemed acceptable and also those locations throughout the community deemed "noise sensitive."
- To utilize the definition of the community noise environment, in the form of Ldn noise contours as provided in the Noise Element for local compliance with the State Noise Insulation Standards. These standards require specified levels of outdoor to indoor noise reduction for new multifamily residential constructions in areas where the outdoor noise exposure exceeds Ldn 60 db.
- To further define the community noise environment in terms of maximum levels of intermittent noise to facilitate local compliance with standards regarding exposure to intermittent noise specified in the Noise Element.

Noise elements are required by Government Code Section 65302(g) and are to be prepared under guidelines established by the Office of Noise Control, California Department of Health.

Based upon noise complaints, analysis of major noise source operations data and noise measurements of major noise sources, the following conclusions are presented:

Highway Traffic (distance measured from edge of outer-most traffic lane)

- Ldn = 60 dBA contours for the Year 2000 on roadways recommended for improvements are:
 - American Canyon Road - 200'
 - SR 29 from American Canyon Road to Southern Crossing - 390'
 - SR 29 from Yountville to St. Helena - 290'
- Ldn = 60 dBA contours for the year 2000 on SR 29 between Napa and Yountville paralleled by frontage roads is 400'*
- Two lane highways and arterials typically carrying traffic at speeds of 45-55 MPH will have Ldn = 60 dBA contours at 300' for ADT of 25,000.
- Two lane highways and arterials typically carrying traffic typically flowing at speeds under 45 MPH will have Ldn = 60 dBA contours at 60' for ADT of 10,000.

Railroad

- The Schellville Branch Ldn = 60 dBA 1/4 mile or more from the nearest crossing is 200'; less than 1/4 mile it is 460'.
- The Vallejo to St. Helena Branch Ldn = 60 dBA 1/4 mile or more from the nearest crossing in less than 50'; less than 1/4 mile it is 80'.
- Intermittent railroad noises Ldn = 65 dBA at 3000' from a locomotive horn.

Airports

- Napa County Airport Year 2000 Ldn = 60 dBA contour extends over a wide area to the Napa River to the west and south and to the railroad tracks to the north and east; intermittent maximum 65 dBA levels range from 1,200' for a single prop plane to 4,000' for a Falcon Jet.

* distance measured in field on Washington Street approximately 1/2 mile north of Washington Street exit.

- Calistoga Airport Year 2000 Ldn = 60 dBA contour closely parallels the north-south runway and extends southerly; maximum intermittent level of 65 dBA is found at a distance of 2000' from a tow plane taking off; typical maximum flyby noise at an altitude of 1,000 to 1,500 feet is 65 dBA; cruising at 500' is 70 dBA - 80 dBA; take off at 500' is 85 dBA.
- The PUC Flight Center Year 2000 Ldn = 60 dBA contour closely parallels the north-south runway and extends northerly; maximum intermittent level of 65 dBA is found at a distance of 1,200' from a typical aircraft taking off; typical maximum flyby noise at 1,000 to 1,500 feet is 65 dBA.

Industry/Commerce

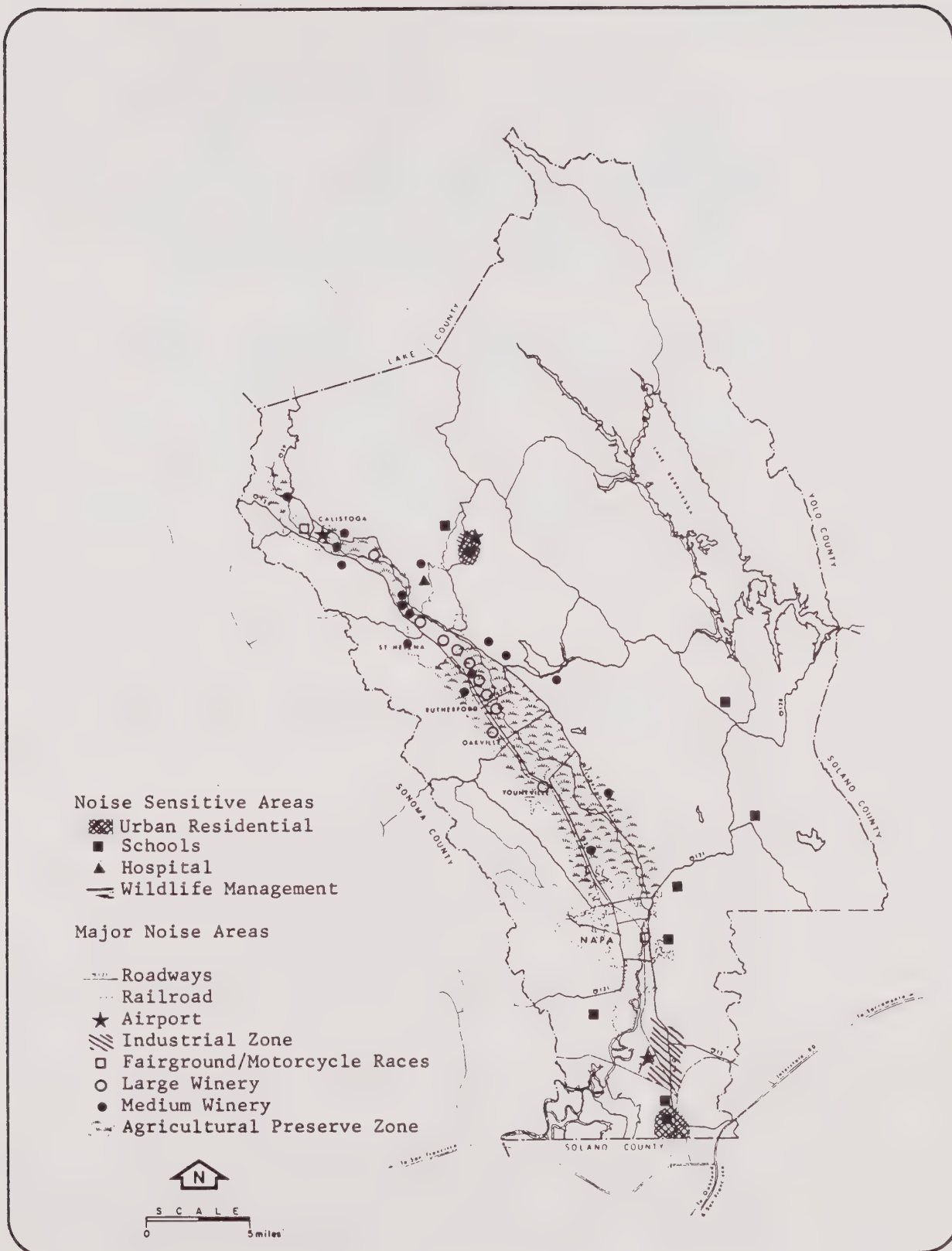
- The Ldn = 60 dBA contour lines for the two largest industries (Kaiser Steel and Basalt Products) are within the property lines except for a small portion south of Basalt.
- A typical large winery seasonal Ldn = 60 dBA or less is a distance of 300' or more from a dumping and crushing area; the annual Ldn = 60 dBA or less is a distance of 125' or more; intermittent noise level of 65 dBA may be 800' from the crush area at time of dumping.
- A typical medium winery seasonal Ldn = 60 dBA or less is a distance of 100 feet or more from dumping and crushing area; the annual Ldn is below 60 dBA at all reasonable distances; intermittent noise level of 65 dBA was 140' from grape dumping operation.

Conclusions

- The general Napa County unincorporated area is a quiet place.
- Occasionally there are noises having levels considerably above the usual ambient which can be disturbing even though they do not significantly raise the annual Ldn. Such noises are due to small aircraft near airfields, vineyard frost fans, diesel pumps in vineyards, heavy vehicle traffic around vineyards and wineries; etc.
- Noise levels in Napa County typically range from 20-25 dBA at 3 AM in an isolated area to 50 dBA near roadways during the day in the south County to 100 dBA 100 feet from a train horn.

- Recommended noise compatibility guidelines relating outdoor and indoor noise levels to various land uses should be used for land use planning.
- Recommended mitigation measures should be among those considered to mitigate noise from existing sources and from noise that could result from planned projects.

FIGURE 117: NOISE SENSITIVE AREAS/MAJOR NOISE AREAS:
NAPA COUNTY UNINCORPORATED AREA



2. GOAL AND POLICIES

Goal: It shall be the goal of Napa County to have a circulation system and patterns of land use developed in a manner which minimizes the impacts of noise pollution from railroads, highways, industry, agricultural uses, airports, recreation areas and to conduct its land use planning and development in such a manner as to minimize activities producing unacceptable noise pollution.

Policies:

- Establish noise standards for future transportation facilities that meet the minimum standards required for the public health, welfare and safety.
- Establish land use policies that discourage the construction of urban residential development and other noise-sensitive activities where noise levels are clearly unacceptable, such as near railroads, highways, industry, agricultural uses, airports and recreation areas.
- Minimize future noise impacts in currently quiet areas.
- Require noise mitigation measures to be included when new residential developments are to be built in close proximity to significant noise sources and develop an equitable system to allocate noise mitigation costs.
- Require that environmental assessment documents for new projects include an analysis of existing and anticipated noise impacts if such are likely to impact on or be produced by the product(s).
- Cooperate with the County's cities to resolve mutual noise problems, such as by developing a uniform noise abatement ordinance and unified enforcement procedure.
- Keep the Noise Element current with changing conditions and standards.
- Inform prospective residents of agricultural-related noises and the County's "Right to Farm" policy in each parcel map approved for locations in or adjacent to designated agricultural areas.

6/7/83

- Establish acceptable noise standards consistent with health and quality of life goals and employ effective techniques of noise abatement through such means as building code, noise, subdivision, and zoning standards.
- Establish noise criteria in the specifications for County purchase of machines, equipment and vehicles.
- Support needed legislation to State and Federal governments to reduce noise generated by motor vehicles, boats and aircraft.

3. ANALYSIS OF EXISTING AND FUTURE NOISE ENVIRONMENT

A given area of a community has a base of steady background noise made up from many sources. This is often referred to as the "ambient noise level" or the normal level of environmental noise. An "intrusive noise" is noise from a single source such as a train, truck or aircraft which is over and above the existing ambient noise at a given location.

In order to describe the acoustic environment and evaluate its impact on humans, a measure of noise is needed which correlates well with human response to noise. A logarithmic scale, utilizing a unit called the "decibel," abbreviated "dB," is useful because it compresses the wide range of sound intensities to which the human ear is sensitive into a reasonable range of numbers. The decibel scale is such that a doubling of a sound intensity produces an increase of 3 dB.

To enhance the correlation between noise measurements and human perception of sound, a sound level meter with a special filter is used. The filter, called an A-weighting filter, de-emphasizes the very low and very high frequency components of sound in a way which mimics the response of the human ear. To monitor a source, the A-weighting filter weights the sound intensities generated at all audible frequencies. The weighted intensities are then combined to determine a single noise level in dB. When an A-weighted filter is used, the unit of measure is called dBA.

In order to express noise level at a given location over a 24 hour period, a day-night average level, or Ldn, is calculated by adding 10 dB to sound levels found after 10 p.m. and before 7 a.m. (see the Appendix for the technical definition of Ldn). This procedure reflects the fact that people and their activities are generally more sensitive to noise at night. The unit of Ldn is dBA.

In some state standards, the CNEL descriptive is used rather than Ldn. However, Ldn and CNEL are numerically equal in practice. Ldn is used throughout this document. Figure 119 indicates the range of typical outdoor noise environment expressed in terms of day-night sound level (Ldn).

Response to noise is subjective and depends upon many factors other than acoustic intensity as reflected in the decibel scale. Examples of additional factors are: character of sound (hissing, rumbling), presence of pure tones, (whine) or information content, variation with time of loudness or pitch, etc. Because standards which take all possible factors

into account are unwieldy, the simple Ldn descriptor is usually used.

For the purposes of planning in Napa County, this procedure is questionable. In general, the county is a quiet place. But in many generally quiet areas there occasionally arise noises having levels considerably above the usual ambient. Such intermittent noises can be disturbing (especially in Napa County) even though they do not significantly raise the annual Ldn. Examples: small aircraft near airfields, vineyard frost fans, pumps in isolated areas, heavy vehicle traffic around vineyard, during crush season, etc.

The high quality of the acoustic environment in Napa County can be maintained and/or improved if planning criteria include intermittent noise levels as well as Ldn's. This can be done by supplementing the State Noise Insulation standards with additional standards regarding exposure to intermittent noise (See pages 415 -418.)

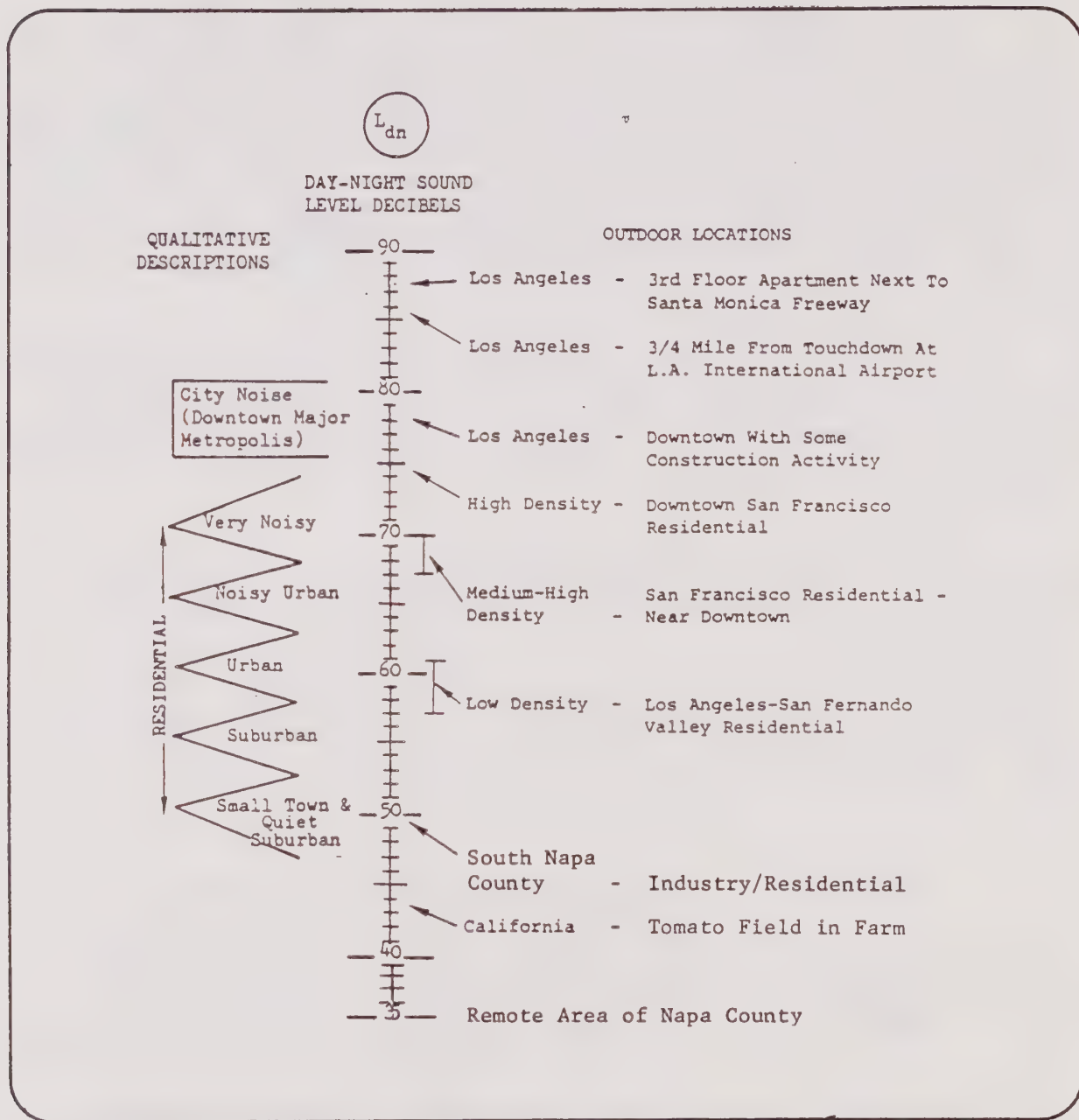
Figure 118 illustrates noise levels in Napa County using the dBA scale. Figure 119 compares selected Napa County noise levels with typical outdoor noise levels in other areas of California.

FIGURE 118: NOISE LEVELS FOUND IN NAPA COUNTY

100 dBA	Train Horn at 100'
80 dBA	Heavy Truck cruising on SR 29 at distance of 60'
75 dBA	"Loud" Motorcycle crossing at 60'
70 dBA	Normal Voice at 2'
65 dBA	Calistoga Tow plane at 1500'
50 dBA	Typical ambient away from roadways during day in So. County
30 dBA	Typical ambient away from roadways during day in No. County
20-25 dBA	3AM in isolated area of County

Source: Sound Solutions, 1982

FIGURE 119: RANGE OF TYPICAL OUTDOOR NOISE ENVIRONMENTS
EXPRESSED IN TERMS OF DAY NIGHT SOUND LEVEL
(L_{dn}), dB



Source: Office of Noise Control; California Department of Health;
Sound Solutions

EXISTING AND FUTURE NOISE ENVIRONMENT

In order to characterize the County's existing and future noise environment, several procedures were followed. First, a number of local public agencies were contacted to determine the types of noise complaints that have recently been received from citizens in the unincorporated areas of Napa County. Second, the public was afforded an opportunity to phone in noise complaints on a local radio talk show. Third, State law required that major sources of environmental noise be identified. Fourth, the law also required that the major sources of noise identified provide operations data to determine present and future noise levels. Fifth, a series of noise measurements were taken at specific locations in the County to further quantify both noise sources and noise sensitive areas. Sixth, and finally, the above data has been used to quantify and illustrate areas in Napa County directly affected by levels of noise exceeding accepted standards.

Noise Complaints

A number of state and local agencies were contacted to determine the location, type and degree of severity of noise complaints received and recorded by the agencies. A summary of the information received follows.

State Agencies

CalTrans, the Highway Patrol and Parks and Recreation were contacted. Although the Highway Patrol does not keep records of complaints, motorcycles are by far the most often called in complaint from all over the County. The Parks and Recreation Department stated that campers at Napa Valley Bothe State Park sometimes ask what noises from the vineyard wind machines, diesel pond pumps and Calistoga races are but are not "irritated" by them. Since the camping spaces have been moved back from Highway 29, there have been no traffic noise complaints.

County Agencies

The Napa County Airport; Animal Control-Shelter; Conservation, Development and Planning Department; County Administrator's Office; Environmental Health Department; Public Works Department; Sheriff's Department; and Agricultural Commissioner were all contacted. The daily logs in the Sheriff's Department were reviewed for a six month period (January 1 through June 30, 1982) to determine noise complaints. All other contacts were by telephone in that

formal complaint files are not maintained for noise complaints by other County agencies.

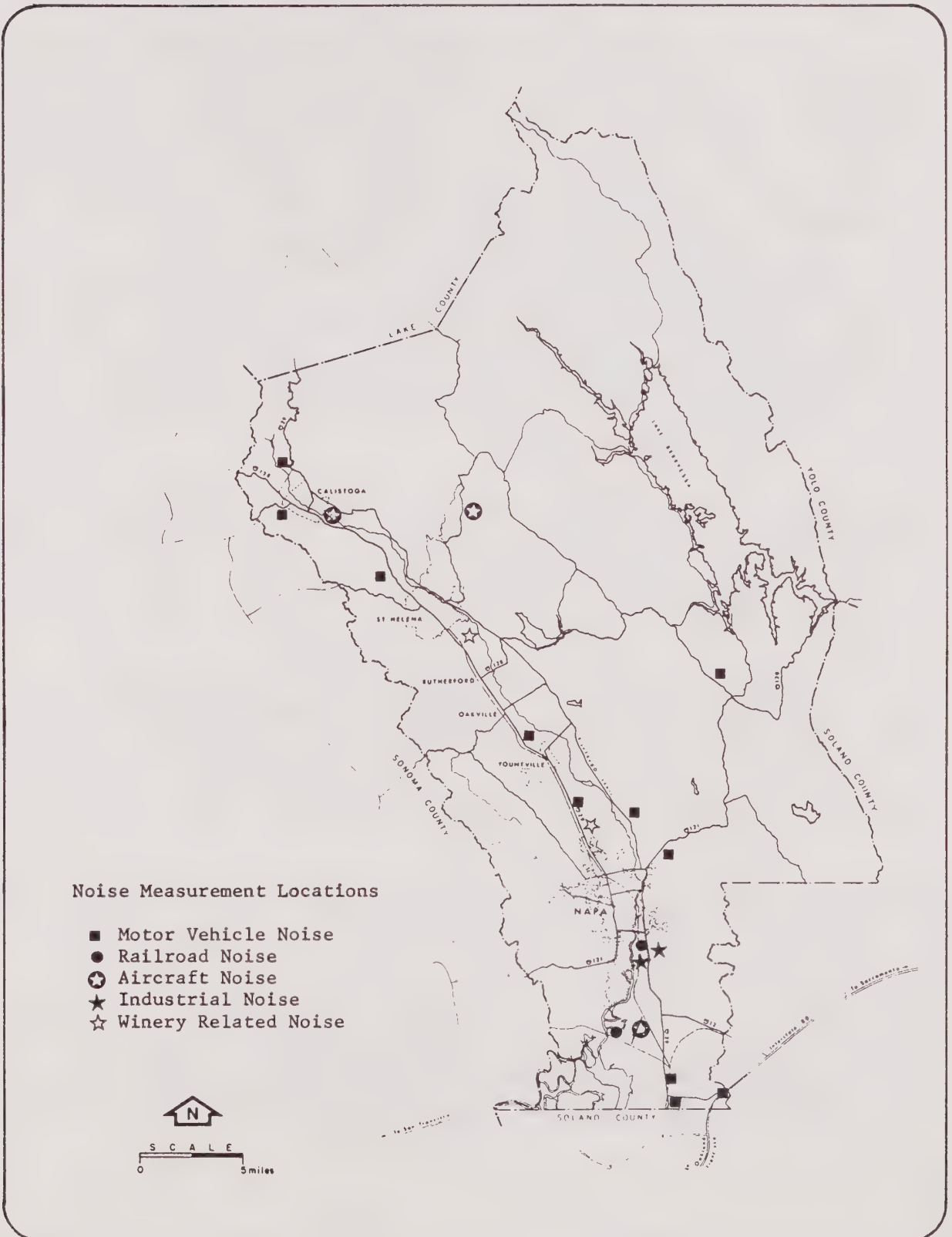
The major types of complaints were motorcycles and loud parties or music. An often-mentioned seasonal complaint is vineyard wind machines. Other complaints noted were helicopters, barking dogs, hot air balloons, construction noises, fire crackers, agricultural water pumps, gun blasts and Calistoga fairgrounds races. Few complaints of other aircraft or highway vehicles and no complaints of railroad operations were noted.

Major Sources of Noise

The above data, together with data provided by other state, local and private agencies, were reviewed in order to identify the major sources of noise in Napa County. The next step was to quantify this data in terms of present and future noise levels. Each of the major sources is noted separately below.

In order to quantify the data in terms of noise levels at or near the major sources of noise, a series of field measurements were taken. Figure 120 pinpoints the locations where measurements were taken for motor vehicle, railroad, aircraft, industrial and winery related noise. The data was then translated to noise contours representing levels of noise exposure around each noise source. Each of the major sources is described below with graphic representation of noise contour lines.

FIGURE 120: NOISE MEASUREMENT LOCATIONS: NAPA COUNTY UNINCORPORATED



Highway Traffic

From noise level measurements taken at twenty locations indicated on Figure 120 and taken at various times of day, together with average daily traffic data for 1981 and the year 2000 (as developed for the Circulation Element), as well as other traffic information from the County's consultants, CalTrans and the County, existing and future noise contours have been calculated along typical segments of the major highways and arterials in Napa County.

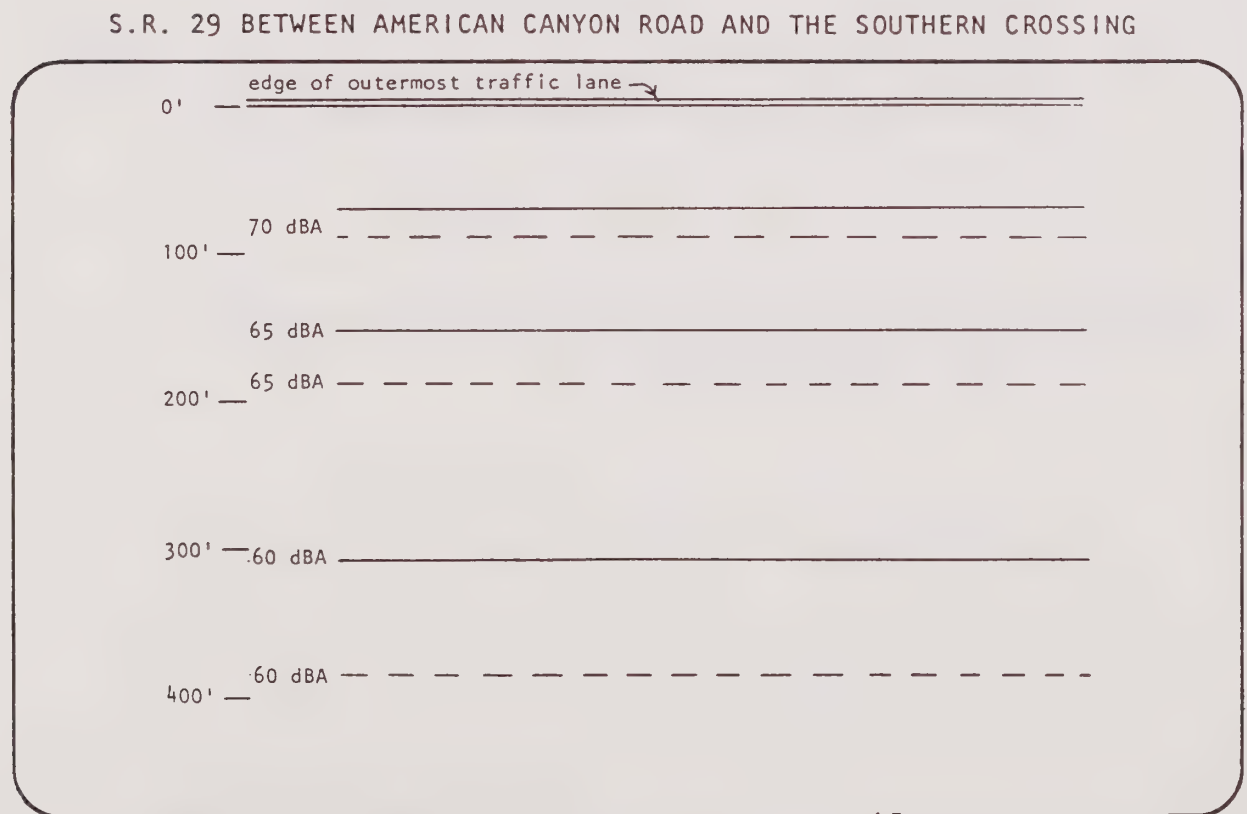
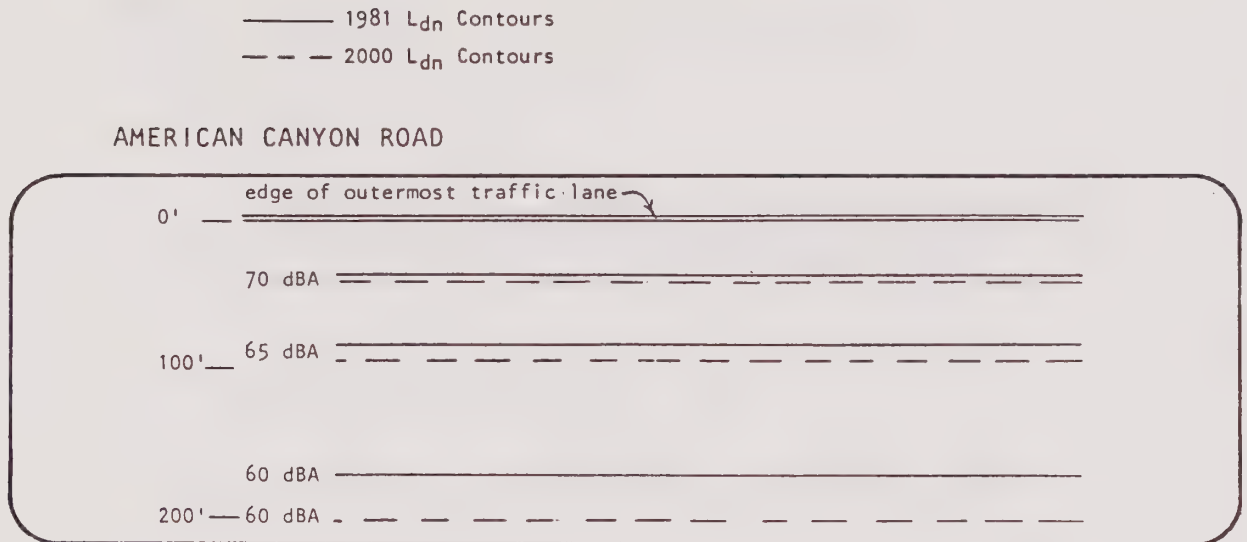
Figure 121 shows contours for 1981 and 2000 for three segments of roadways where improvements have been recommended in the Circulation Element (see Figures 66 and 68). The 1981 contours reflect existing levels of noise from existing traffic levels while the 2000 contours assume completion of recommended improvements and year 2000 traffic levels. Figure 122 indicates contours for four lane highways not specifically referred to in other figures.

For other segments of two lane highways and arterials typically carrying traffic at speeds of 45 to 55 MPH, Figure 123 indicates noise contours for three levels of average daily traffic. Figure 124 indicates contours for the two lane roadways under 45 MPH. Figure 125 shows contours for SR 29 between Napa and Yountville where frontage roads parallel the highway.

Figure 127 list the 1981 and 2000 average daily traffic for state and local county roadways, respectively. The State Highways with year 2000 ADT estimated to be in excess of 20,000 are most segments of SR 29 and portions of SR 12. The only county roadway with estimated year 2000 ADT in excess of 20,000 is American Canyon Road.

The highway traffic contours are to be used when developments are proposed along segments of State or County highways and roadways. By taking into account highway or roadway type, location, traffic speed, projected average daily traffic and, where applicable, planned roadway improvements, a preliminary indication can be made as to Ldn contours along the roadway adjacent to the proposed development. By applying the Noise Compatible land use guidelines on page 416, the County will be able to assess the potential noise impact on the proposed project. Depending upon the proposed site plan, additional noise evaluation may be needed.

FIGURE 121: NOISE CONTOURS, HIGHWAY IMPROVEMENT PLAN FOR YEAR 2000

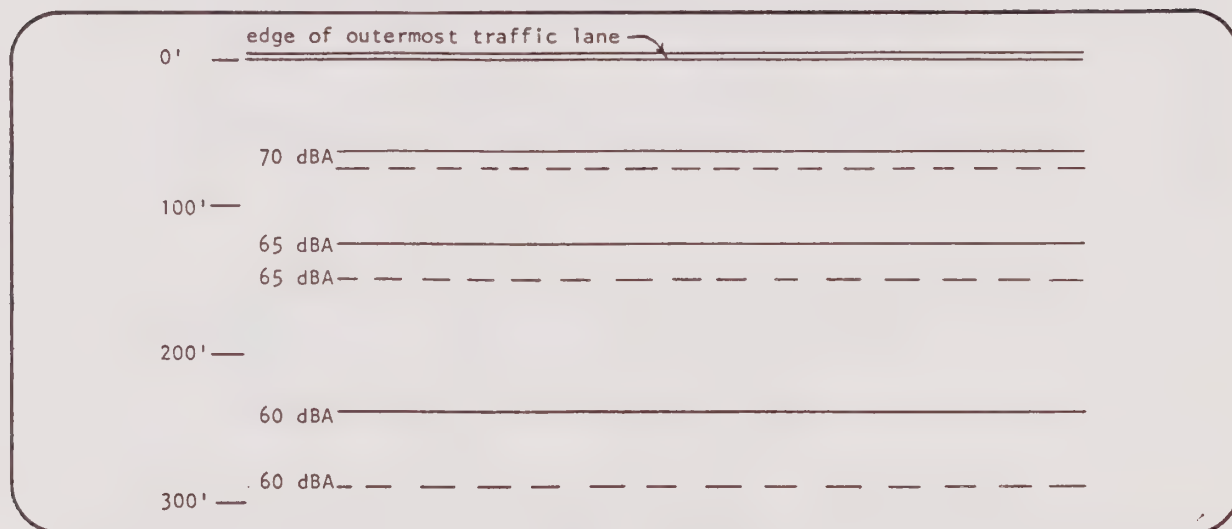


Source: Sound Solutions, 1982

FIGURE 121: (Continued)

—— 1981 L_{dn} Contours
--- 2000 L_{dn} Contours

S.R. 29, YOUNTVILLE TO ST. HELENA

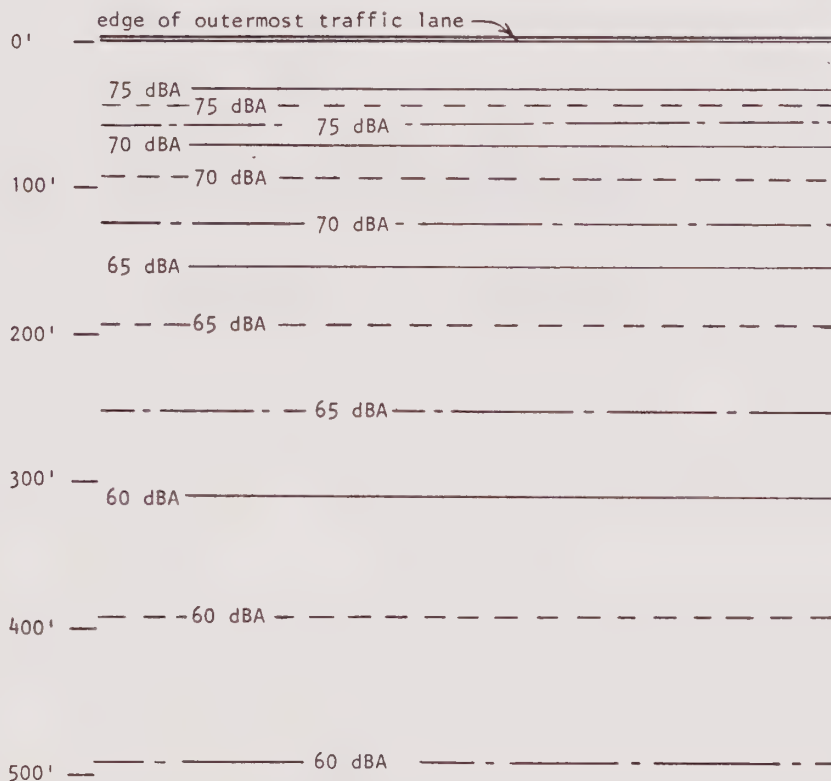


Source: Sound Solutions, 1982

FIGURE 122: Ldn CONTOURS DUE TO MOTOR VEHICLE TRAFFIC (4 LANE HIGHWAY)

The contours shown are those adjacent to four lane highways not specifically referred to in other figures

SYMBOL	TRAFFIC VOLUME (ADT)
————	25000
-----	40000
-----	60000

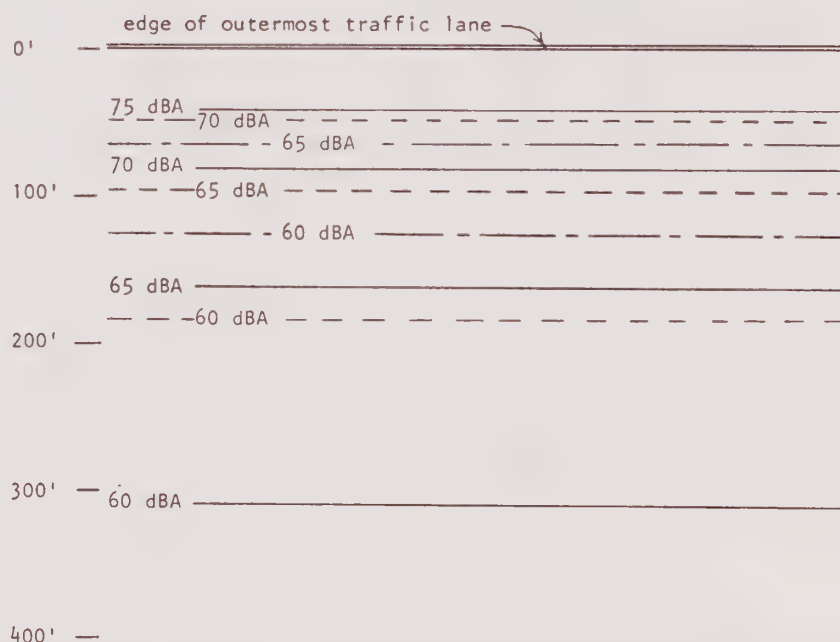


Source: Sound Solutions, 1982

FIGURE 123: Ldn CONTOURS DUE TO MOTOR VEHICLE TRAFFIC (2 LANE HIGHWAY)

The contours shown are those adjacent to two lane highways and arterials typically carrying traffic at speeds of 45-55 MPH

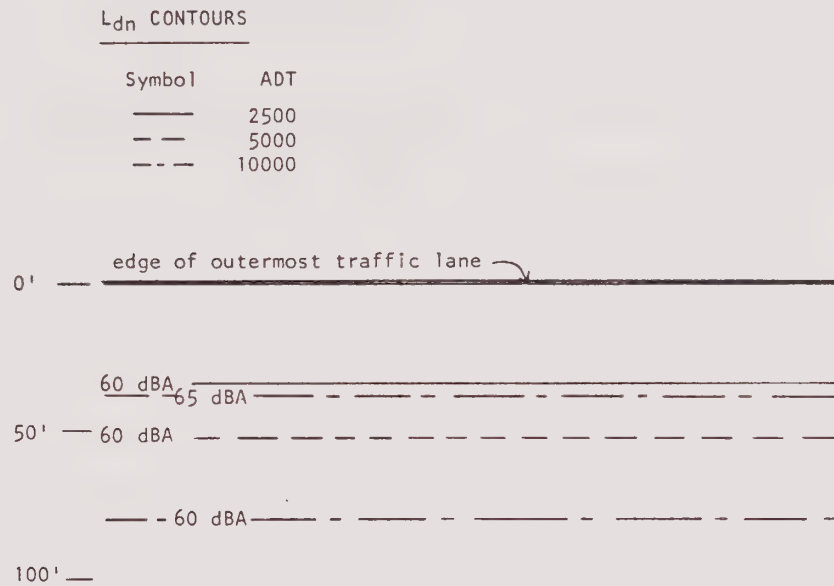
SYMBOL	TRAFFIC VOLUME (ADT)
---	5000
----	10000
=====	25000



Source: Sound Solutions, 1982

FIGURE 124: L_{dn} CONTOURS DUE TO MOTOR VEHICLE TRAFFIC (GENERAL)

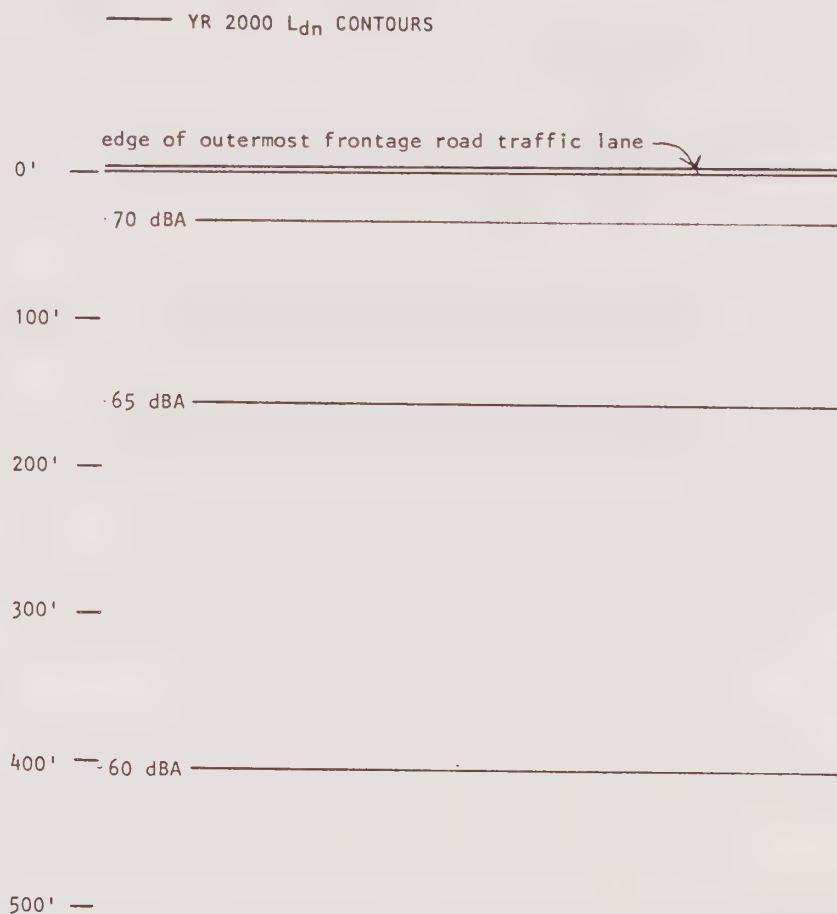
The contours shown are applicable to arterials and other roads along which traffic typically flows at speeds under 45 MPH.



Source: Sound Solutions, 1982

FIGURE 125: MOTOR VEHICLE TRAFFIC NOISE CONTOURS (SR 29)

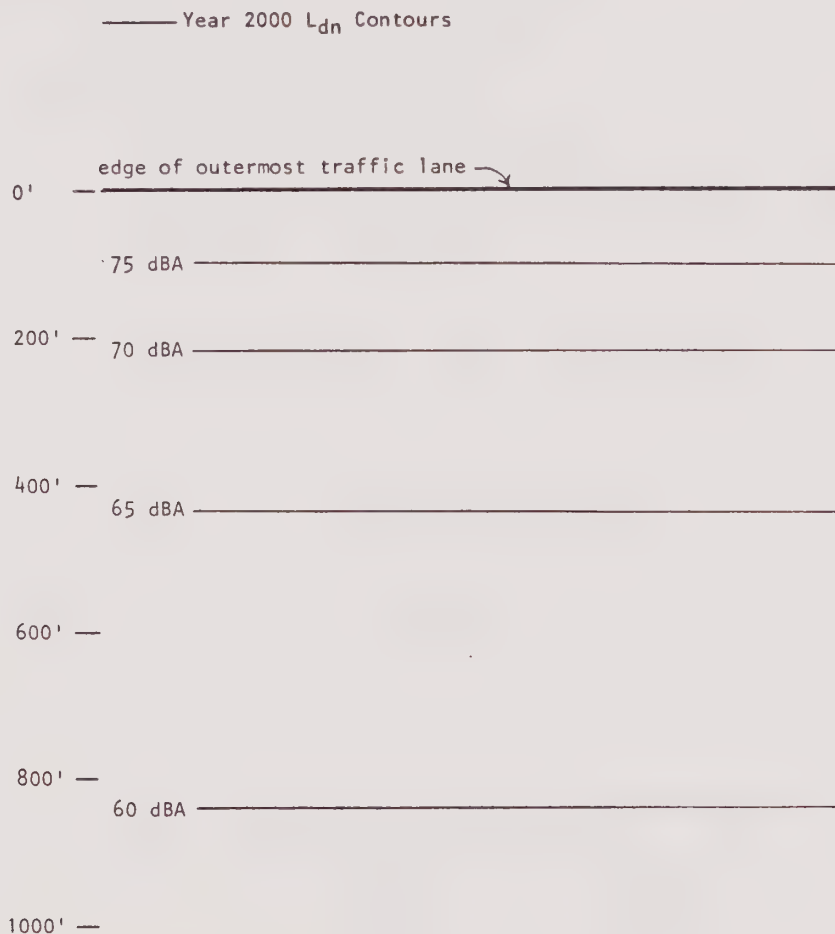
The contours shown are applicable to sections of SR 29 between Napa and Yountville which are paralleled by frontage roads.



Source: Sound Solutions, October, 1982

FIGURE 126: MOTOR VEHICLE TRAFFIC NOISE CONTOURS (I-80)

The contours shown apply to the segment of Interstate 80 which crosses the Southeast corner of Napa County



Source: Sound Solutions, October, 1982

FIGURE 127: TRAFFIC VOLUMES 1981-2000

Roadway	Section		1981 ADT	Est. 2000 ADT
	From	To		
SR 29	Solano County	American Canyon Rd.	26,500	38,000
SR 12	Solano County	SR 29	10,000	25,000
SR 29/221	SR 12	Imola Ave.	32,200	46,000
SR 29	Airport Road	SR 121	33,400	48,000
SR 12/121	Sonoma County	SR 29	13,100	18,000
SR 29	Trancas St.	Yountville	14,200	20,300
SR 29	Yountville	St. Helena	14,900	21,300
SR 29	St. Helena	Calistoga	5,300	7,600
SR 29	Calistoga	Lake Co.	3,400	12,000
SR 121	Silverado Tr.	Wooden Vly.	5,200	7,500
SR 121	Wooden Vly.	Moskowite Corner	1,900	2,700
American Canyon Rd.	I 80	SR 29	--	21,000
Silverado Tr.	Trancas	Yountville Cross	7,400	9,600
Silverado Tr.	Yountville Cross	Oakville Cross	4,400	5,700
Silverado Tr.	Oakville Cross	SR 128	10,300	13,400
Silverado Tr.	SR 128	St. Helena	8,000	10,000
Silverado Tr.	St. Helena	Calistoga	2,200	2,900
Tubbs Lane Cross	SR 29	Silverado Trail	2,600	3,300

Source: Wilbur Smith and Associates, 1982

Railroad

Using noise level measurements of typical operations and data from the Southern Pacific Transportation Company on existing and future operations levels in Napa County, Year 2000 noise contours have been calculated for the three SP branches in Napa County. The potential for increased freight rail usage resulting from industrial development was included.

Figure 129 locates the two Southern Pacific Transportation Company branches that traverse Napa County. The Schellville Branch parallels SR 12 from I 80 and curves south to a junction north of American Canyon and extends from the junction west to Sonoma County. The Vallejo-St. Helena branch, the one that serves Napa County per se, parallels SR 29 from Solano County to north of St. Helena.

Figure 130 indicates the railroad contours for the Schellville Branch and Vallejo-St. Helena Branch for the year 2000. Two sets of contours are indicated for the Schellville Branch, one 1/4 mile or more from the nearest crossing and one less than 1/4 mile of a crossing. When a train is within 1/4 miles of a crossing, the horn is sounded and increases the noise level. Only one set of contours is shown for the Vallejo-St. Helena Branch for less than 1/4 mile of a crossing. When a train on this branch is more than 1/4 mile from a crossing, the Ldn = 60 dBA contours are closer than 50 feet from the track because no horn is used.

Figure 128 below indicates the typical maximum intermittent noise levels for all lines.

FIGURE 128: TYPICAL MAXIMUM INTERMITTENT NOISE
NAPA COUNTY RAILROAD BRANCHES: YEAR 2000

<u>Source</u>	<u>Distance to Track</u>	<u>Level (dBA)</u>
Locomotive, Wheel/rail Noise	180 Feet	75
Locomotive, Wheel/rail Noise	570 Feet	65
Locomotive, Horn	1200 Feet	75
Locomotive, Horn	3000 Feet	65

Source: Sound Solutions, 1982

FIGURE 129 - SOUTHERN PACIFIC TRANSPORTATION LINES: NAPA COUNTY

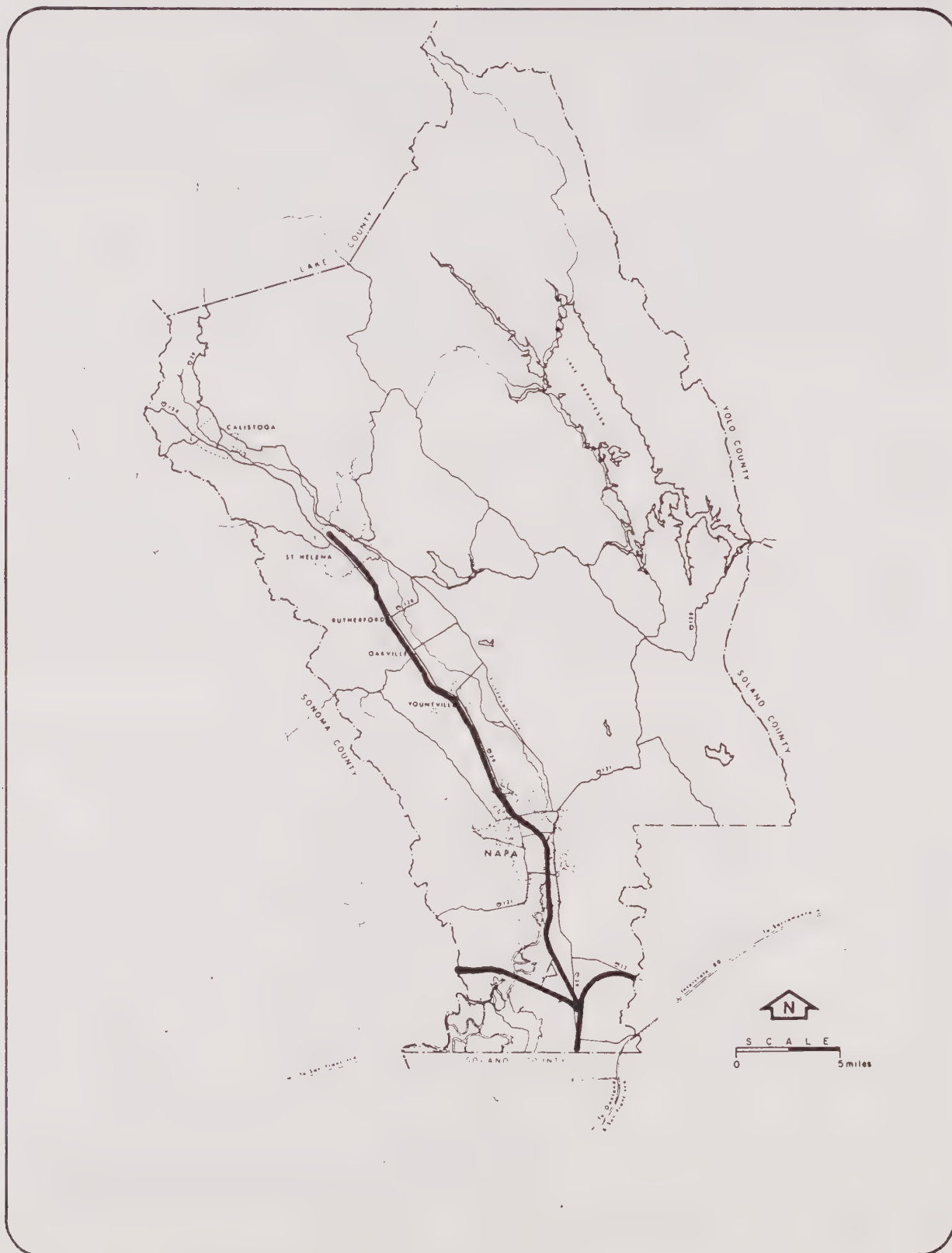
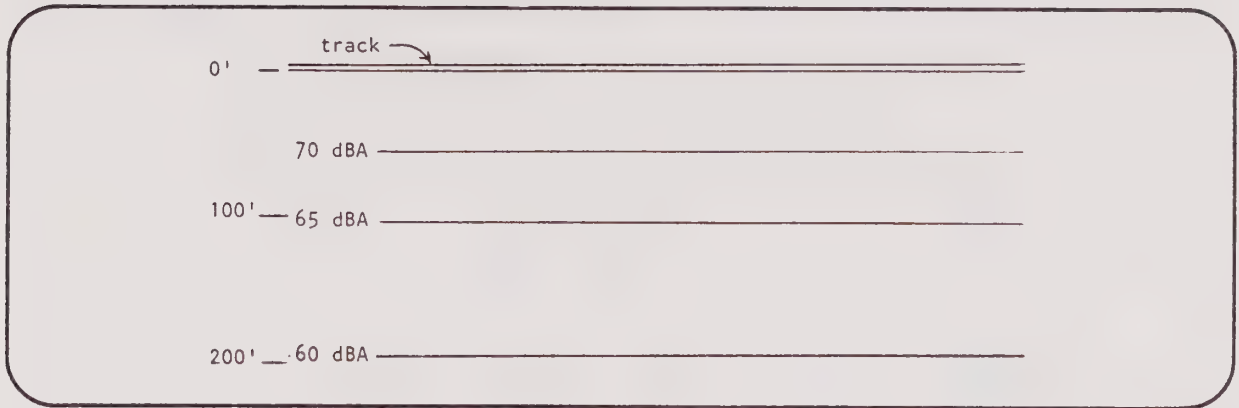


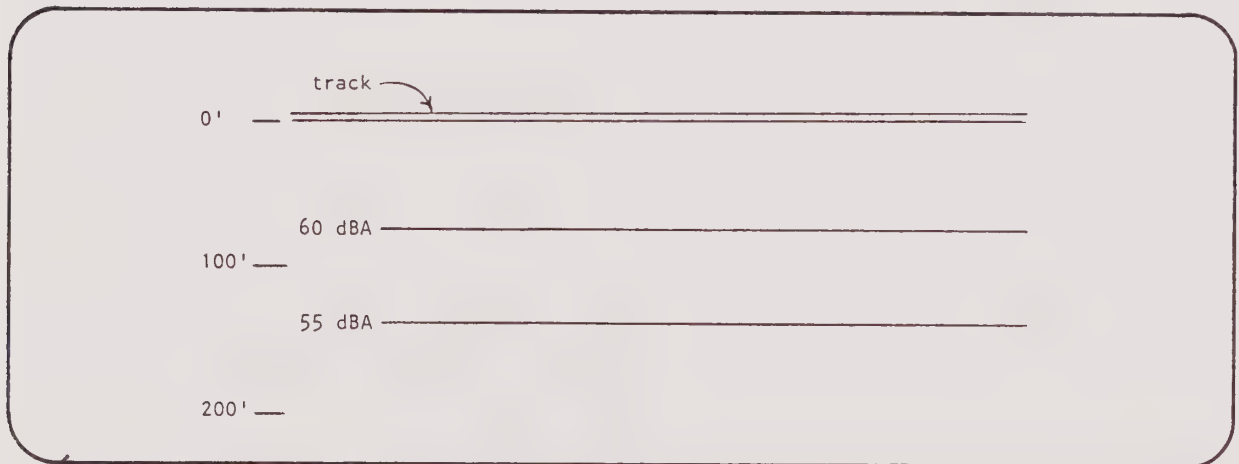
FIGURE 130: RAILROAD NOISE CONTOURS

—— YEAR 2000 L_{dn} CONTOURS

A. SHELLVILLE BRANCH, 1/4 MILE OR MORE FROM NEAREST CROSSING



B. VALLEJO AND CALISTOGA BRANCHES, WITHIN 1/4 MILE OF A CROSSING

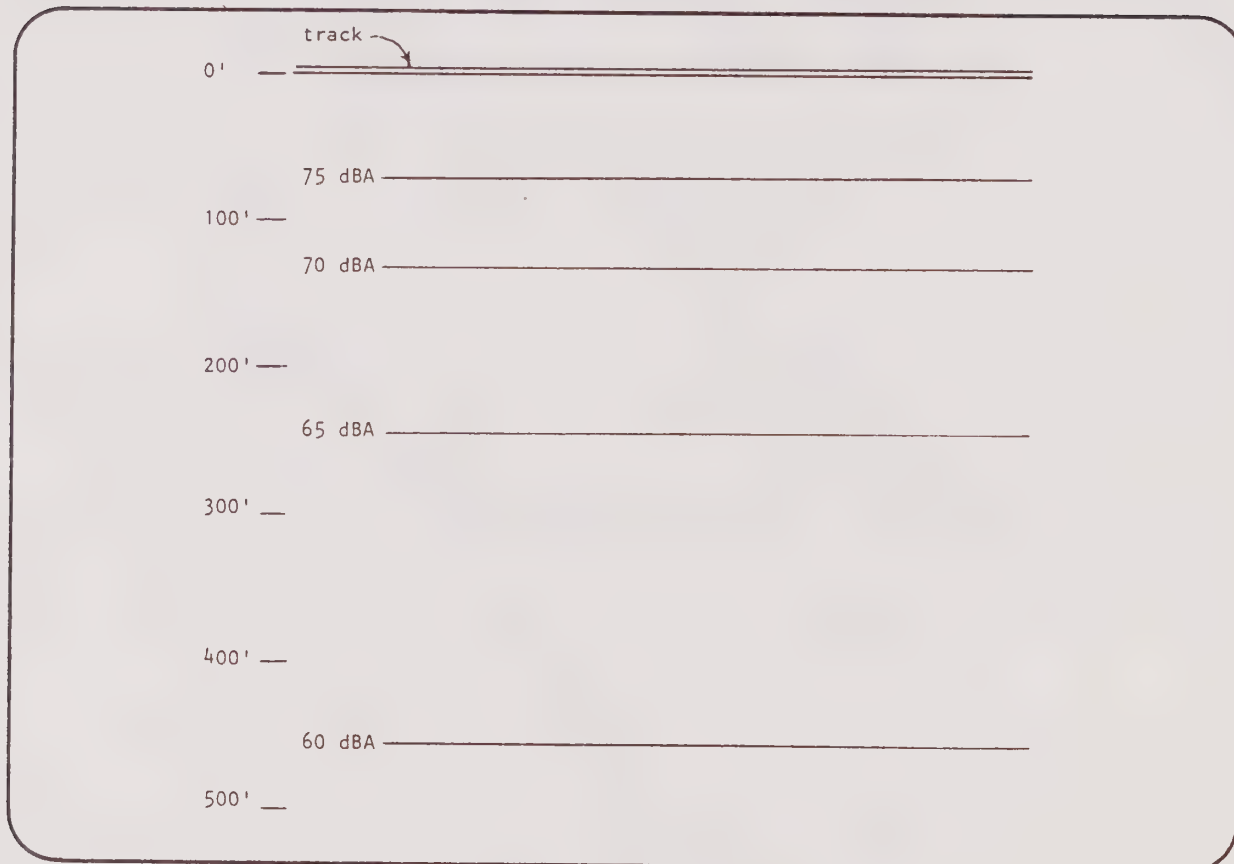


Source: Sound Solutions, 1982

FIGURE 130 (Continued)

— YEAR 2000 L_{dn} CONTOURS

C. SHELLVILLE BRANCH, WITHIN 1/4 MILE OF A CROSSING



Source: Sound Solutions, 1982

Airports

Three Napa County based airports - the Napa County Airport, Calistoga Airport and PUC Flight Center - were evaluated in terms of existing and future levels of operations. From the operations data (types of aircraft, typical flights per day, etc.) and onsite noise level measurements, noise contours around each airport were calculated.

The Napa County Airport is located south of the City of Napa. Based on the level of operations, type of aircraft landing and taking off and field measurement, Figure 134 shows the 60 Ldn contour around the airport for the Year 2000.

The typical maximum intermittent noise from aircraft takeoffs near the runways is shown in Figure 131 below:

FIGURE 131: TYPICAL MAXIMUM INTERMITTENT NOISE DUE TO AIRCRAFT TAKEOFFS - NAPA COUNTY AIRPORT YEAR 2000

<u>Aircraft</u>	<u>Distance (Line of Sight to aircraft)</u>	<u>Typical Maximum Level (dBA)</u>
Single Engine Propeller	500 feet	75
Single Engine Propeller	1,200 feet	65
Twin Engine Propeller	800 feet	75
Twin Engine Propeller	1,500 feet	65
Falcon Jet (IASCO)	2,000 feet	75
	4,000 feet	65

Source: Sound Solutions, 1982

The Calistoga Airport is located within the City of Calistoga, but flight patterns for glider tow planes extend into unincorporated areas. Figure 135 shows the 60 Ldn contour for normal flight patterns.

Figure 132 below indicates typical maximum intermittent noise during takeoff of the tow plane for gliders when the receiver is near the airfield. Some 90 percent of the

operations at the Calistoga Airport are glider tow planes. The typical maximum flyby noise at altitude of 1,000 to 1,500 feet is 65 dBA.

FIGURE 132: TYPICAL MAXIMUM INTERMITTENT NOISE
CALISTOGA AIRPORT TOW PLANE TAKEOFFS: YEAR 2000

<u>Distance (line of sight to aircraft)</u>	<u>Typical Maximum Level (dBA)</u>
700'	75
2000'	65

Source: Sound Solutions, 1982

The PUC Flight Center is located in the unincorporated community of Angwin. The Center's noise contour lines are shown in Figure 136.

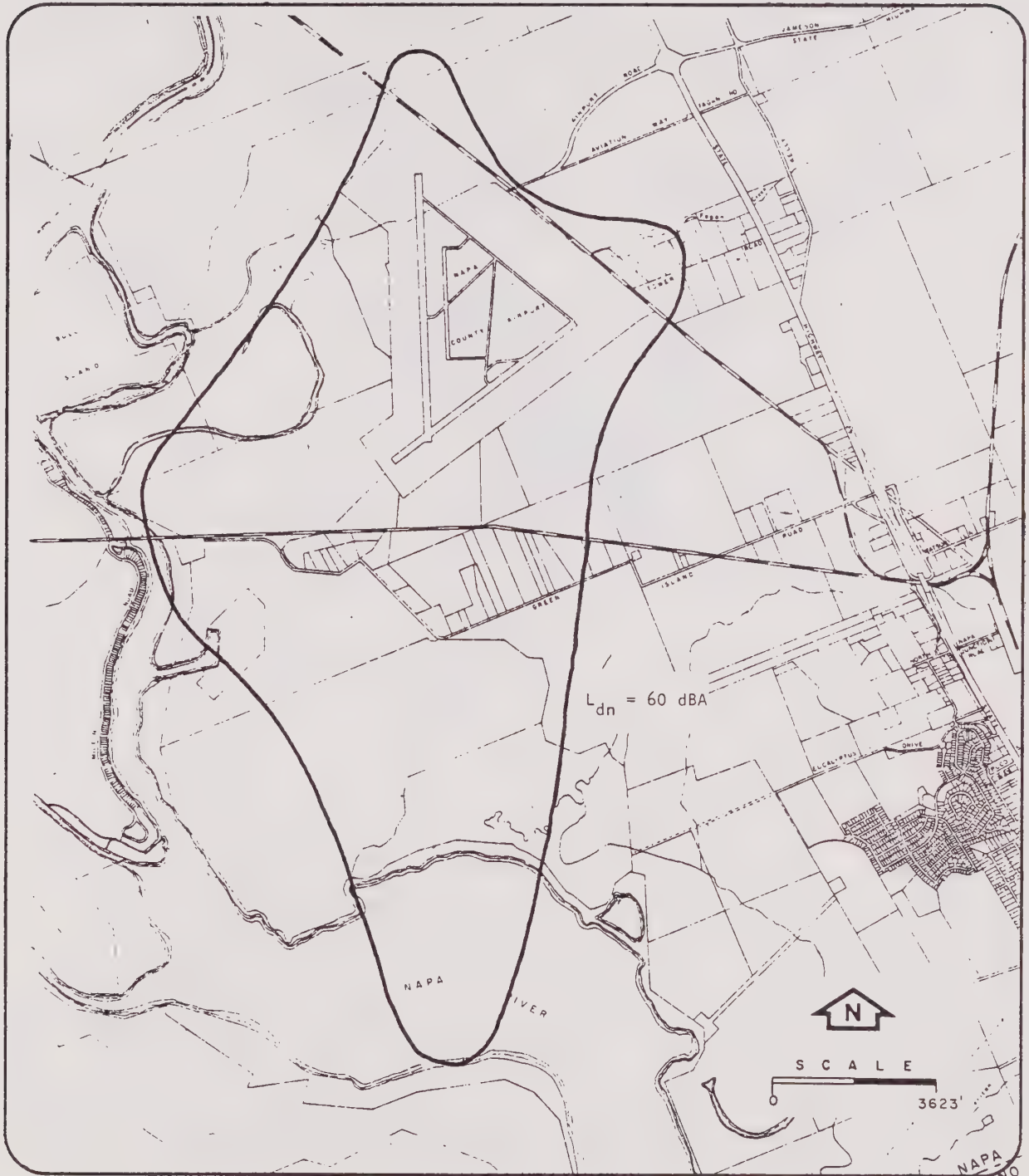
The typical maximum intermittent noise during takeoff when the receiver is near the airfield is shown in Figure 133 below. The typical maximum level during flyby at 1,000 to 1,500 feet elevation is 65 dBA.

FIGURE 133: TYPICAL MAXIMUM INTERMITTENT NOISE
PUC FLIGHT CENTER: YEAR 2000

<u>Distance (line of sight to aircraft)</u>	<u>Typical Maximum Level (dBA)</u>
500'	75
1200'	65

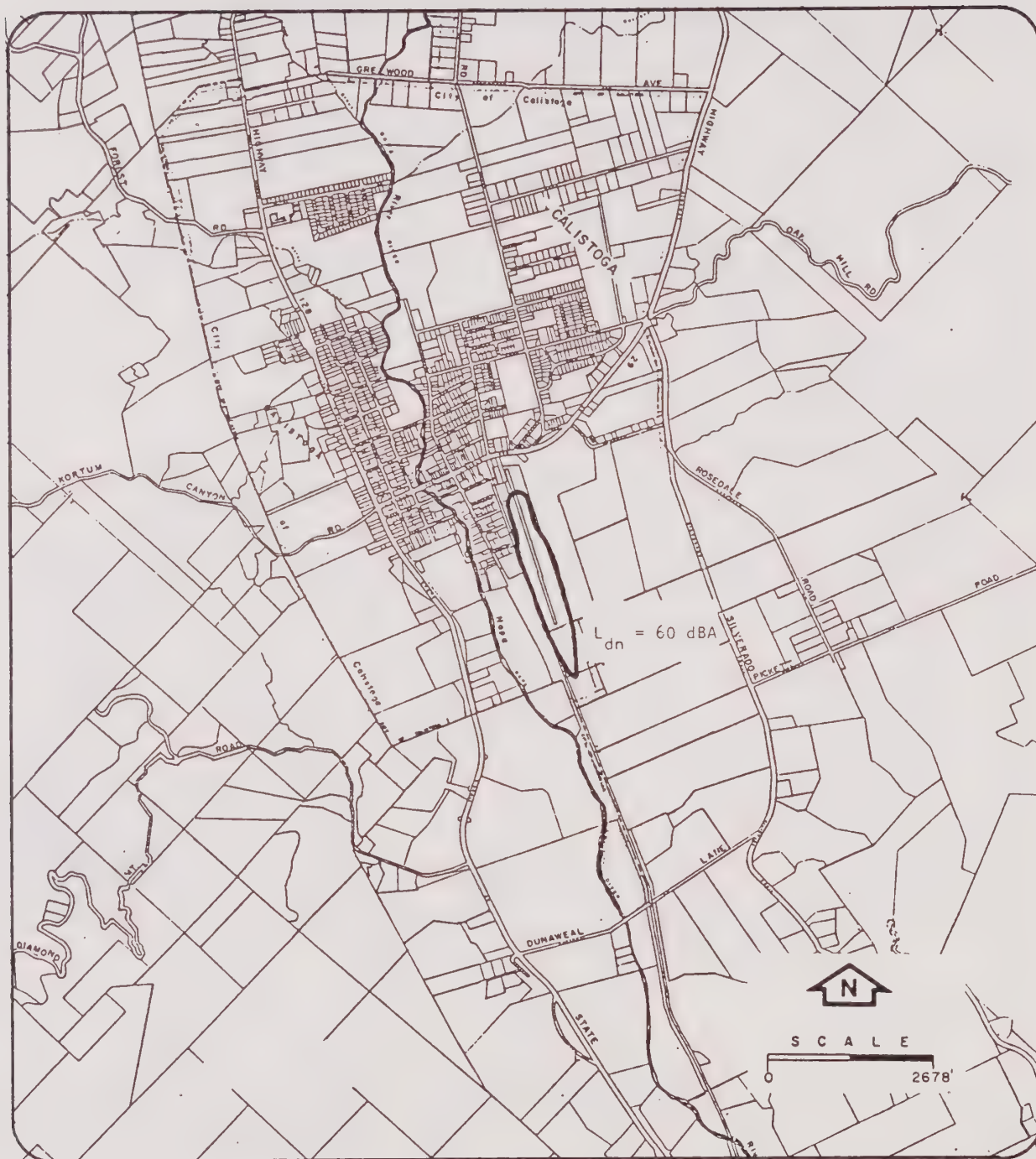
Source: Sound Solutions, 1982

FIGURE 134: NAPA COUNTY AIRPORT NOISE CONTOUR: YEAR 2000



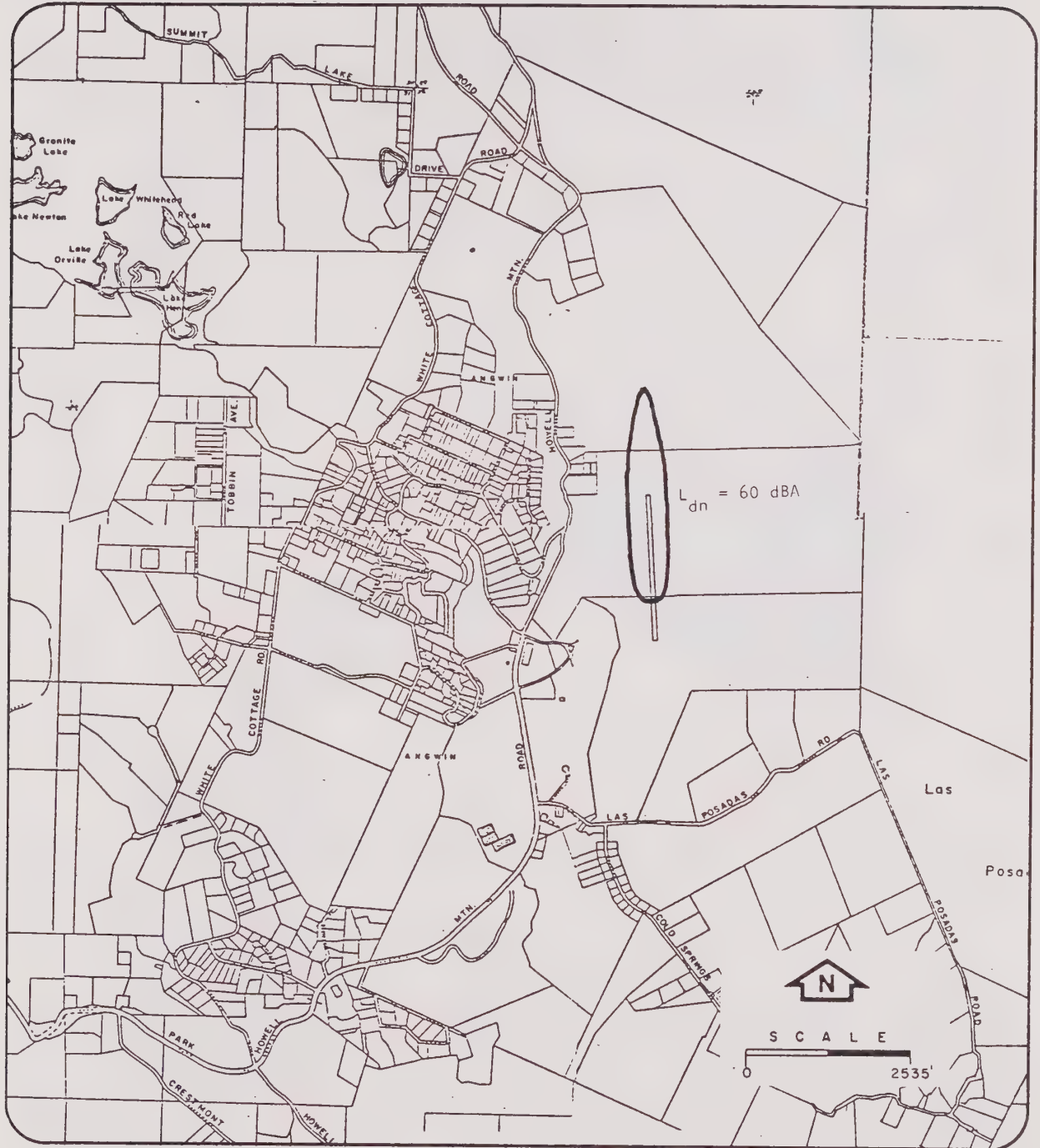
Source: Sound Solutions, 1982

FIGURE 135: CALISTOGA AIRPORT NOISE CONTOUR: YEAR 2000



Source: Sound Solutions, 1982

FIGURE 136: PUC FLIGHT CENTER NOISE CONTOUR: YEAR 2000



Source: Sound Solutions, 1982

Industry/Commerce

Major industrial noise sources (primarily Basalt Products and Kaiser Steel) were evaluated in terms of current and future levels of operation. Using operations data (type of machinery, hours of operation, etc.) and onsite noise level measurement, noise contours were calculated. Agricultural noise sources (wineries, wind machines, tractors and water pumps) cannot meaningfully be evaluated with the same methodology as year round sources. Most agricultural noises are intermittent, seasonal noises that cannot be expressed in Ldn terms.

Figure 137 indicates the Ldn=60 dBA contour lines for Basalt Products and Kaiser Steel. Except for a portion protruding south of the Basalt asphalt and concrete plants, the 60 dBA line is within the property lines of the industries.

The sources considered in the field measurement and analysis included:

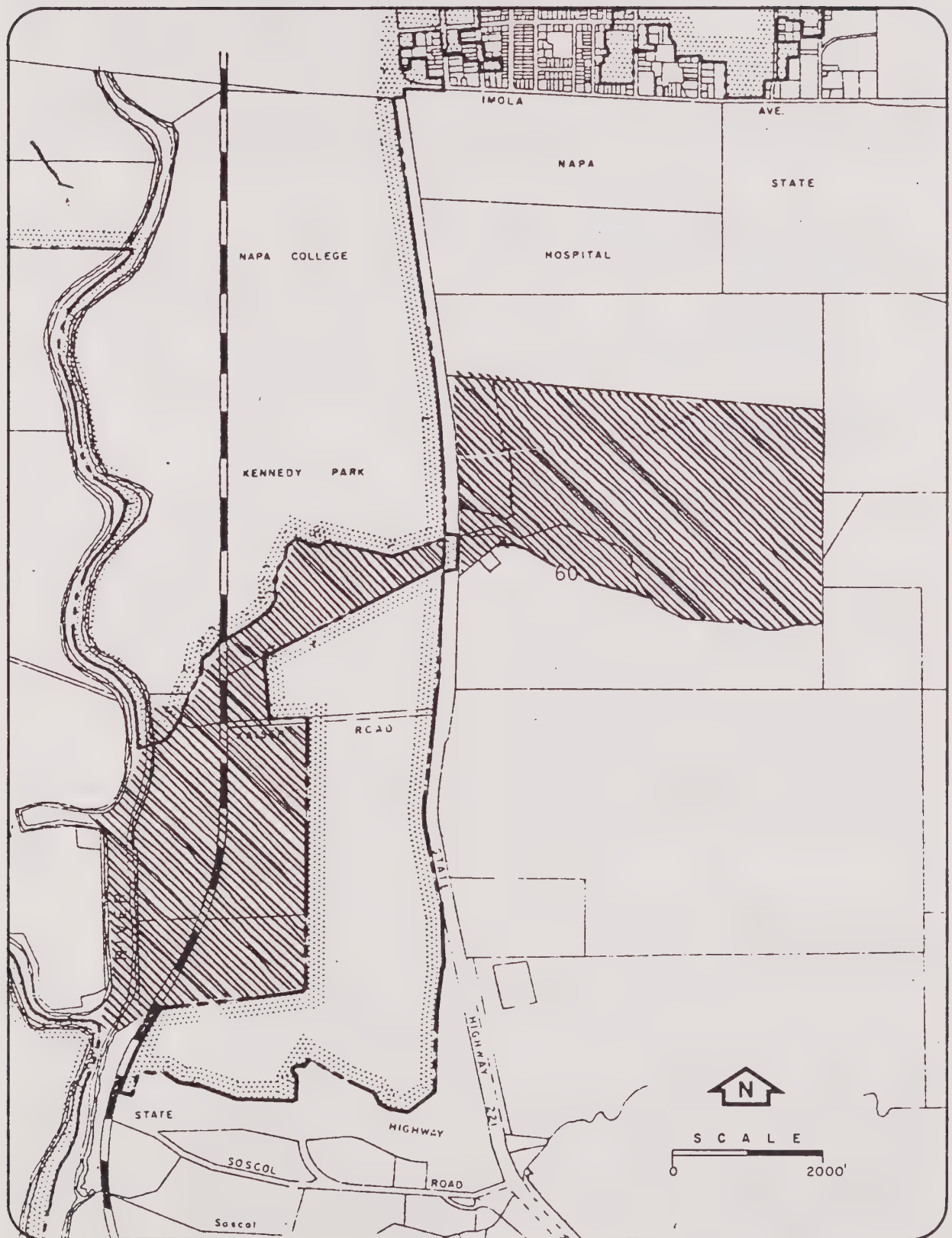
1. Basalt: Precast concrete plant, asphalt plant, concrete plant, rock crushing, trucks, blasting and barge loading.
2. Baselite Block: Block cutting and grounding, forklifts and loaders.
3. Shamrock: Machine shop.
4. Kaiser Steel: Fabrication plant, pipe mill, cranes, forklifts, trucks, etc.

The intermittent noise, primarily from heavy trucks (e.g. - rocks banging in dump trucks), typical maximum levels are 75 dBA at 225 feet and 65 dBA at 710 feet.

Two types of wineries were evaluated in terms of operations and on-site measurement. One of the largest wineries in the County, Christian Brothers, was evaluated, and a medium sized winery, Trefethen, was evaluated. The data gathered and analyzed can reasonably be assumed to be typical of wineries of the two sizes studied and therefore typical of most wineries in Napa County as the types of equipment and operations performed are standardized as far as exterior operations are concerned. Smaller wineries are expected to generate noise levels comparable to, and probably lower than, medium capacity wineries.

Based on information gathered about the measured wineries and others as well, there is little noisy activity at large or medium size wineries except during crush season (primarily September and October). For a typical large capacity winery the seasonal Ldn (two month period) is 60 dBA or less at a

FIGURE 137: INDUSTRIAL NOISE CONTOURS: YEAR 2000



Source: Sound Solutions, 1982

distance of 300 feet or more from the grape dumping and crushing area. The annual Ldn (negligible noise off-season) is 60 dBA or less at a distance of 125 feet or more.

Intermittent noise due to fixed machinery and vehicles is dependent upon the receiver's position relative to vehicle paths as well as to the crushing area. Typical maximum intermittent levels are shown in Figure 138 below:

FIGURE 138: TYPICAL MAXIMUM INTERMITTENT NOISE
LARGE WINERY: YEAR 2000

<u>Distance to Crush Area</u>	<u>Maximum Intermittent Level (dBA)</u>
270 feet (grape dumping operation)	75
800 feet (grape dumping operation)	65
<u>Distance to Vehicle Path</u>	
65 feet (empty gondola)	65

Source: Sound Solutions, 1982

For a typical medium capacity winery the seasonal Ldn (two month period) is 60 dBA or less at a distance of 100 feet or more from dumping and crushing area. The annual Ldn is below 60 dBA at all reasonable distances. Intermittent noise due to fixed machinery and vehicles are indicated below in Figure 139:

FIGURE 139: TYPICAL MAXIMUM INTERMITTENT NOISE
MEDIUM WINERY: YEAR 2000

<u>Operation/Source</u>	<u>Distance to Source</u>	<u>Maximum Intermittent Level (dBA)</u>
Dumping grapes	140 feet	65
Tractor with Empty Gondola	100 feet	65

Source: Sound Solutions, 1982

Other Noise Sources

Other sources noted during the complaint survey (motorcycles, loud parties or music, barking dogs, hot air balloons, construction noises, fire crackers and Calistoga races) are generally intermittent noises that usually affect few people but are annoying to a few.

4. NOISE COMPATIBLE LAND USE PLANNING

With the data on present and future noise levels from preceding chapters, this chapter addresses the question of how much noise is too much. Figure 140 below presents noise compatibility guidelines for Napa County. The definitions of the four levels of compatibility are listed in Table 10.

Some noise sources in Napa County are intermittent and/or seasonal in nature. Such sources may have deleterious effects on the general high quality of the acoustic environment of the county even though they have a negligible effect on Ldn levels. For planning purposes, the limits on interior intermittent noise given in Figure 142 should be considered in addition to the Ldn guidelines in Figure 140 to evaluate noise from an existing or proposed development. When acceptable levels are exceeded or expected to be exceeded, mitigation measures (see pages 419-420) should be used to reduce the noise and/or insulate interior building spaces.

Since standard construction can provide about 15 dBA attenuation, the criteria in Figure 142 suggest special attention to residences liable to be exposed to maximum outdoor levels of 65 dBA - 75 dBA due to intermittent sources.

Distances from the sources studied at which these levels rise have been given in previous tables.

These intermittent noise standards should receive special attention when projects are considered in "Tentatively Compatible" or "Normally Incompatible" areas as determined by the Ldn criteria, but, ideally, they would be considered in all cases.

Noise Exposure Inventory

In an urban setting where major noise sources expose quantifiable numbers of people to varying levels of noise above local standards, a noise exposure inventory is helpful to further evaluate a community's noise problems. Unincorporated Napa County is predominantly rural in character and land use and is planned to remain so. Furthermore, the nature of the County's noise problems are predominantly intermittent, and there are no constant, major noise sources that create ongoing problems with the possible exception of the Calistoga Airport tow planes.

In view of the specific noise environment in Napa County's unincorporated area, a noise exposure inventory would not result in quantified data of substantial levels to be

FIGURE 140: NOISE COMPATIBILITY GUIDELINES

<u>Land Use</u>	<u>Completely Compatible</u>	<u>Tentatively Compatible</u>	<u>Normally Incompatible</u>	<u>Completely Incompatible</u>
Residential	less than 55	55-60	60-75	greater than 75
Commercial	less than 65	65-75	75-80	greater than 80
Industrial	less than 70	70-80	80-85	greater than 85

SOURCE: Environmental Protection Agency, San Francisco Department of City Planning, San Mateo County Airport Land Use Commission, Santa Clara County Airport Land Use Commission, San Jose Planning Department, Porter & Schwartz, and Bolt, Beranek & Newman.

FIGURE 141: NOISE COMPATIBILITY DEFINITIONS

- Completely Compatible: The noise exposure is such that both the indoor and outdoor environments are pleasant.
- Tentatively Compatible: The noise exposure is great enough to be of some concern, but common building construction practices will make the living indoor environment acceptable, even for sleeping quarters, and the outdoor environment will be reasonably pleasant for recreation and play.
- Normally Incompatible: The noise exposure is so severe that unusual and costly building construction is necessary to ensure some tranquility inside one's home, and barriers must be erected between the site and prominent noise sources to make the outdoor environment tolerable.
- Completely Incompatible: The noise exposure at the site is so severe that construction costs to make the indoor living environment acceptable would be prohibitive and the outdoor environment would still be intolerable.

SOURCE: Napa County LAFCOM, 1981.

useful in solving noise problems. The noise compatible guidelines in this chapter and the mitigation measures in Chapter V are adequate to address the kinds of noise problems identified in this element.

FIGURE 142: RECOMMENDED MAXIMUM INTERIOR NOISE LEVEL
CRITERIA FOR INTERMITTENT NOISE

Generalized Land Use (Occupancy)	Maximum Int. Intermittent Noise - dBA	Basis for Criteria
A. RESIDENTIAL - SINGLE AND TWO FAMILY DWELLINGS		
1. Living Areas		
a. Daytime	60	Conversation - 5 ft. - normal voice
b. Nighttime	55	Conversation - 10 ft. - normal voice
2. Sleeping areas	50	Sleeping
B. RESIDENTIAL Multiple Family Apartments	Same as A	Same as A.
C. EDUCATIONAL FACILITIES, ETC.		
1. Concert Hall	25	Intrusion of noise may spoil artistic effect
2. Legitimate Theater	30	Intrusion of noise may spoil artistic effect
3. School Auditorium	35	Minimize intrusion into artistic performance
4. School classroom	55	Speech communication - 20 ft. - raised voice
5. School Laboratory	60	Speech communication - 8 ft. - normal voice
6. Church Sanctuaries	45	Speech communication - 50 ft. - raised voice
7. Library	55	Speech communication - 3 ft. - normal voice
D. RECREATIONAL FACILITIES		
1. Motion Picture Theater	45	Minimize intrusion into artistic performance
2. Sports Arena	75	Conversation - 2 ft. - raised voice
3. Bowling Alley	75	Conversation - 2 ft. - raised voice
E. COMMERCIAL, MISCELLANEOUS		
1. Hotel, Motel Sleeping	50	Sleeping
2. Hospital Sleeping	50	Sleeping
3. Executive Offices, Conf. Rooms	55	Speech communication - 12 ft. - normal voice
4. Staff Offices	60	Speech communication - 8 ft. - normal voice
5. Sales, Secretarial	65	Satisfactory telephone use
6. Restaurants	65	Conversation - 4 ft. - normal voice
7. Markets, Retail Stores	65	Conversation - 4 ft. - normal voice
F. LIGHT INDUSTRIAL		
1. Office Areas	See E-3, 4, 5	See E-3, 4, 5
2. Laboratory	60	Speech Communication - 8 ft. - normal voice
3. Machine Shop	75	Speech Communication - 3 ft. - raised voice
4. Assembly, Construction	75	Speech Communication - 2 ft. - raised voice
G. HEAVY INDUSTRIAL		
1. Office Areas	See E-3, 4, 5	See E-3, 4, 5
2. Machine Shop	75	Speech Communication - 3 ft. - raised voice
3. Assembly, Construction	75	Speech Communication - 2 ft. - raised voice

Source: Adapted from Table 2 in "Noise Insulation Problems in Buildings", Paul S. Veneklasen & Associates, January 1973.

5. IMPLEMENTATION ACTION PROGRAM

The following are examples of mitigation measures which should be considered to mitigate noise from existing sources and from noise that could result from planned projects.

Existing Noise Sources

1. Motor Vehicles

1.a. Enforce State and Federal Noise regulations for motor vehicles.

1.b. Enact a noise ordinance applicable to motor vehicles.

1.c. Erect walls, berms, etc. along roadways with specific designs to be site dependent.

1.d. Require (as part of permit review procedures) heavy vehicles to 1) operate only during daytime hours (7 AM to 7 PM); 2) meet applicable noise emission standards; and 3) operate on restricted days of the week.

2. Aircraft

2.a. Require flight paths to meet FAA and California State Department of Aeronautics regulations regarding altitude away from airports, take-off and landing patterns and airport noise limits.

2.b. Encourage use of airport by aircraft classes with low noise output; discourage use by others.

2.c. Reduce flight frequency over noise sensitive areas and at noise sensitive times of day.

2.d. Provide shielded "run up" areas as needed.

3. Railroads

3.a. Erect walls, berms, etc. by tracks with specific designs to be site dependent.

3.b. Eliminate unnecessary crossings in order to minimize horn use.

3.c. Restrict days of week and times of day of operations including switchyard work.

3.d. Encourage track upkeep.

3.e. Encourage travel at low speeds.

4. Industry (including wineries)

4.a. Erect walls, berms, etc. where practical and effective on a case-by-case basis.

4.b. Restrict time of day and days of week for operations.

4.c. Encourage control of noise within site by means such as quiet machinery, buildings around noisy operations and performance of noisy operations indoors.

5. Miscellaneous

5.a. Enact a noise ordinance restricting noise levels to no more than 5 db above "normal" ambient level at receiver's location or producer's property line.

5.b. Enforce State noise insulation regulations.

Planning Measures

1. Approve new projects in accordance with proper land use as determined by noise contours.

2. Maintain maximum distances possible between recognized noise sources and planned noise sensitive projects.

3. Enforce State regulations requiring acoustical studies of noise sensitive projects in and near marginal areas to insure State standards for noise insulation are met.

4. Consider criteria for intermittent noise given in Figure 142 in addition to State insulation standards.

5. Maintain maximum separation between newly approved noise sources and noise sensitive areas.

6. Require noise surveys as part of EIRs for noise producing projects proposed near noise sensitive areas.

BIBLIOGRAPHY

California Department of Health, Office of Noise Control, February, 1976. "Guidelines for the Preparation and Content of Noise Elements of the General Plan," Berkeley.

Butte County Planning Department, January, 1977. "Draft Butte County General Plan, Noise Element."

Contra Costa County, 1975. "Noise Element."

Solano County, May, 1977. "Health and Safety Element; Seismic Safety, Noise."

Wilbur Smith and Associates, June 15, 1982. "Napa County Circulation and Scenic Highways Element and Environmental Impact Report; Working Paper #1; Existing Transportation Setting."

Wilbur Smith and Associates, June 15, 1982. "Napa County Circulation and Scenic Highways Element and Environmental Impact Report; Working Paper #2; Traffic Forecasts and Alternative Transportation Concepts."

Paul S. Venekiasen and Associates, January, 1973. "Noise Insulation Problems in Buildings," Table 2.

6. APPENDIX

DEFINITIONS

<u>Decibel, dB:</u>	A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure.
<u>A-Weighted Sound Level:</u>	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.
<u>Equivalent Energy Level, Leq:</u>	The sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. Leq is typically computed over 1, 8, and 24 hour sample periods.
<u>Ldn:</u>	Day-Night Average Level. The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of 10 decibels to sound levels in the night before 7 am and after 10 pm. <u>Note:</u> Ldn represents daily levels of noise exposure averaged on an annual basis. In some State standards the term CNEL (Community Noise Equivalent Level) is used; however, CNEL and Ldn are numerically the same in practice.
<u>Noise Exposure Contours:</u>	Lines drawn about a noise source indicating constant energy levels of noise exposure. Ldn is the metric utilized herein to describe community exposure to noise.
<u>Ambient Noise Levels:</u>	The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

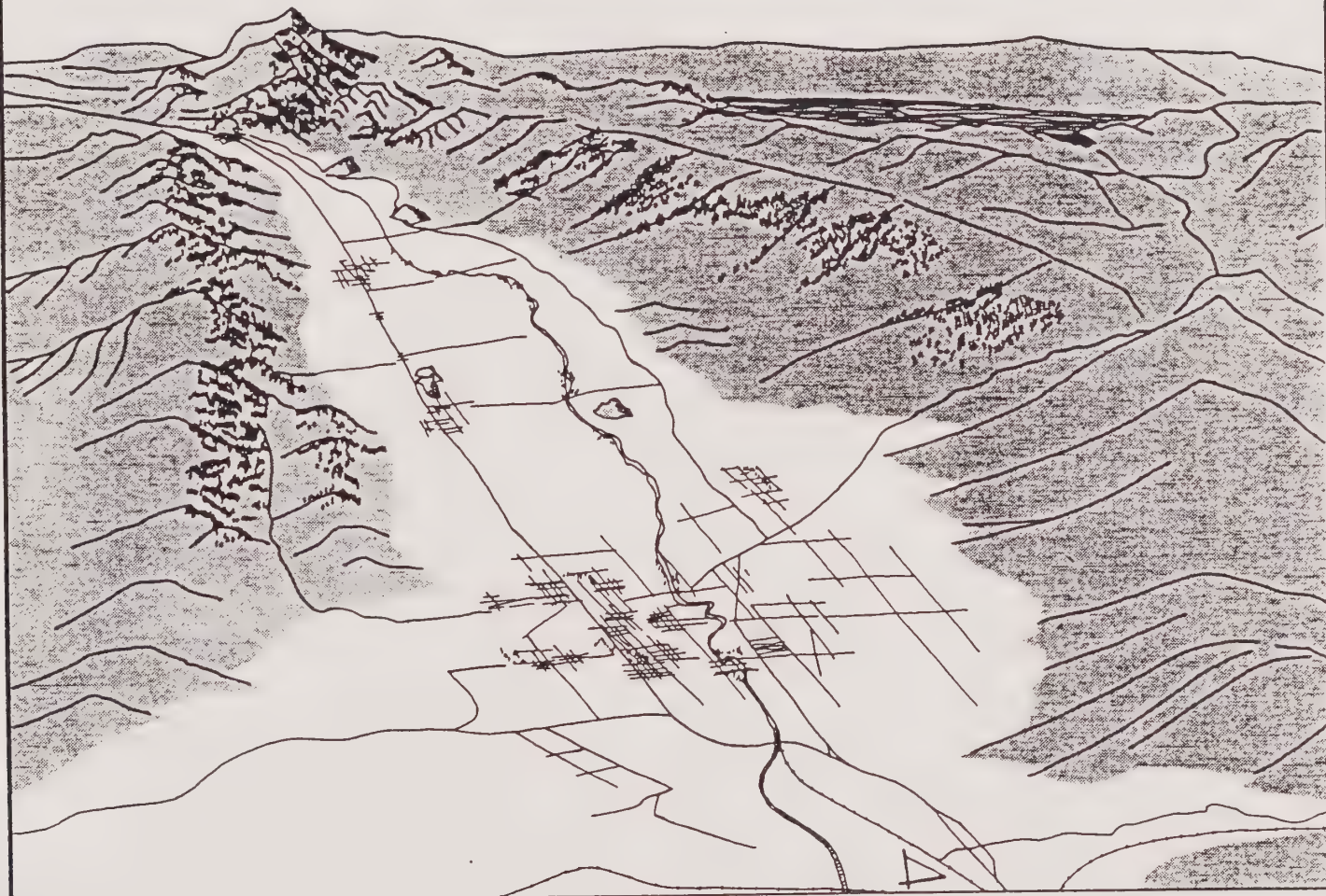
Intrusive
Noise:

That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency and time of occurrence, and tonal or informational content as well as the prevailing ambient noise level.

Equal
Noisiness
Zones:

Defined areas or regions of a community wherein the ambient noise levels are generally similar (within a range of 5 dB). Typically, all sites within any given noise source will be of comparable proximity to major noise sources.

INDEX



GENERAL PLAN

INDEX

	<u>PAGES</u>
Acceptable Risk	312-314
Affordable Housing	140
Agricultural Issues and Policies	24-26
Agricultural Land	226-229
Agricultural Resource	39
Agriculture Watershed and Open Space	39
Air Quality	242-243
Air Transportation	163
Airport Noise	407-411
Archaeology and Historic Areas	235-236
Building Permit Allocation, Growth Management System	138
Circulation Element	159-206
Glossary	202-203
Annual Daily Traffic	162-176
Functional Classification	161
Goals and Policies	183-193
Aviation	189-190
Non-motorized Transportation	191-193
Rail Service	190-191
State Highways and County Roads	184-188
Transit and Paratransit	188-189
Waterway Transportation	191
Transportation System Improvement Program	195-201
Cities	36
Coastal Forest and Conifer Habitat	220
Commercial	37
Commercial Issues and Policies	29
Commuting	13
Conservation and Open Space Element	213-250
Goals and Policies	214-244
Dam Failure	333-338
Density Standards	36-39
Development Determinants Composite Map	34
Disaster Preparedness	356-371
Disaster Planning Policies	368-371
Earth Movement History	256-260
Earthquakes	256-266, 290-294
Ecological Study	222-223
Emergency Water Supplies	345-346
Employment	6-12, 77-79
Employment Trends for Future	11
Evacuation Routes	339-344
Fire Hazard	316-324
Fire Hazard Areas	320
Fire Protection	346-353

INDEX

	<u>PAGES</u>
Acceptable Risk	312-314
Affordable Housing	140
Agricultural Issues and Policies	24-26
Agricultural Land	226-229
Agricultural Resource	39
Agriculture Watershed and Open Space	39
Air Quality	242-243
Air Transportation	163
Airport Noise	407-411
Archaeology and Historic Areas	235-236
Building Permit Allocation, Growth Management System	138
Circulation Element	159-206
Glossary	202-203
Annual Daily Traffic	162-176
Functional Classification	161
Goals and Policies	183-193
Aviation	189-190
Non-motorized Transportation	191-193
Rail Service	190-191
State Highways and County Roads	184-188
Transit and Paratransit	188-189
Waterway Transportation	191
Transportation System Improvement Program	195-201
Cities	36
Coastal Forest and Conifer Habitat	220
Commercial	37
Commercial Issues and Policies	29
Commuting	13
Conservation and Open Space Element	213-250
Goals and Policies	214-244
Dam Failure	333-338
Density Standards	36-39
Development Determinants Composite Map	34
Disaster Preparedness	356-371
Disaster Planning Policies	368-371
Earth Movement History	256-260
Earthquakes	256-266, 290-294
Ecological Study	222-223
Emergency Water Supplies	345-346
Employment	6-12, 77-79
Employment Trends for Future	11
Evacuation Routes	339-344
Fire Hazard	316-324
Fire Hazard Areas	320
Fire Protection	346-353

	<u>PAGES</u>
Fires, Structural	317-321
Fires, Wildlands	316-324
Fishery and Wildlife Habitat	214-222
Flood Hazards	330-338
Flood Hazard Policies	338
Floodplains	239-240
Flood Zones from Dam Failure	279
Geologically Hazardous Areas	284
Geologic Hazards	282-285, 326-329
Geologic Hazard Policy	328-329
Geologic Risks	282-285
Geologic/Seismic Report Guidelines	295-298
Geology, Structural	253-256
Ground Failure	266-279
Ground Shaking	260-266
Groundwater Recharge	227
Growth Management System	105-108, 134-149
Affordable Housing	140
Definitions	148-150
Exempted Development	138, 139
Lottery	143-145
Growth Rate Calculation	137
"Granny Units"	47-49
Highways	163
Alternatives	175, 178-182
Congestion	174, 176, 179
Levels of Service	168-172
Noise	394-402
Trip Distribution	169, 173
Historic and Archaeologic Areas	235-236
Historic Trends	3
Housing Element	40-135
Affordability	46-48
Assistance Programs	119-121
Characteristics	74-75
Condition of Structures	80-82
Definitions	116-118
Energy Conservation	57-58
Existing Programs	112, 113
Farmworkers	99, 100
5 Year Housing Development	51-53
Goals	43-45
Housing Authority	133
Intervention Techniques	66-68
Governmental Constraints	56-57, 111-112
Growth Management System	107-110
Leveraging	67
Living Conditions	97, 98
Location, Density and Timing	53-55
Market constraints	110
New Construction Needs	109, 110
Overcrowding	95
Policies, Objectives and Programs	45-62

Pricing	84-90
Program Summary	59-62
Regional Housing Need	106-110, 122-131
Rehabilitation	45-46
Second Units	47-49
Special Needs	48-51, 98-99
Strategy	66
Urban Facilities and Services	55-56
 Industrial	 38
Industrial Issues and Policies	30, 31
Industrial Noise	412-414
 Jobs, Housing Balance	 77
 Landslides	 267-271
Land Subsidence	272-279
Land Use Element	1-39
Goals	18
Map	32-36
Policies	19-33
Trends	15-17
Liquefaction	272-274
 Marshland Habitat	 219
"Measure A"	146
Mineral Deposits	232-234
 Noise Element	 381-423
Action Program	419-420
Compatible Land Use Planning	415-418
Complaints	391
Definitions	422-423
Goals and Policies	386-387
Measurement	388-393
Sensitive Areas	385
Non-motorized Transportation	164
 Oak Woodland	 220, 224
Open Space Action Program	245
Open Space Areas, Countywide Significance	246
Open Space Goals and Policies	214-244
Open Space and Watershed Issues and Policies	20, 21
 Paratransit	 164
Population	3
Population Characteristics	69-79, 91-94
Population Forecasts	4
Population Growth Rates	5
Public Health and Safety	213, 237-244
Public, Institutional	38
 Railroad Noise	 403-406
Rail Service	164
Rangeland	225-226

Recreation	22-23, 213, 235-236
Recreation Issues and Policies	22-23
Residential Issues and Policies	26-28
Residential, land suitable	98-106
Reservoir Habitat	219
Resource Preservation	213, 214-223
Resource Production	213, 224-234
Riparian Woodland	219, 225
Rural Residential	37
Safety Element	311-380
Goals	315
Scenic Areas	236
Scenic Highways Element	207-212
Candidates for Scenic Highway Designation	208
Criteria	209
Goals and Policies	211-212
School Facilities Element	152-158
Districts	156
Existing Facilities and Enrollments	154-155
Goals and Policies	153
Overcrowding Mitigation Measures	157, 158
Seismic Safety Element	251-310
Bibliography	306-310
Glossary	299-305
Goals and Policies	286-289
Seiche	279-281, 333, 340
Slow Growth Initiative Measure A	146
Tidelands	222
Transit	163, 165
Transportation Hazards	339-344
Transportation Planning Goals and Policies	183-193
Travel Patterns	167, 169
Tsunami	281, 333
Unstable Soils	238-239
Urban Growth	243-244
Urban Residential	36
Watershed	227-230, 241-242
Waterway Transportation	164
Wildlife and Fishery Habitat	214-222



C124904997

